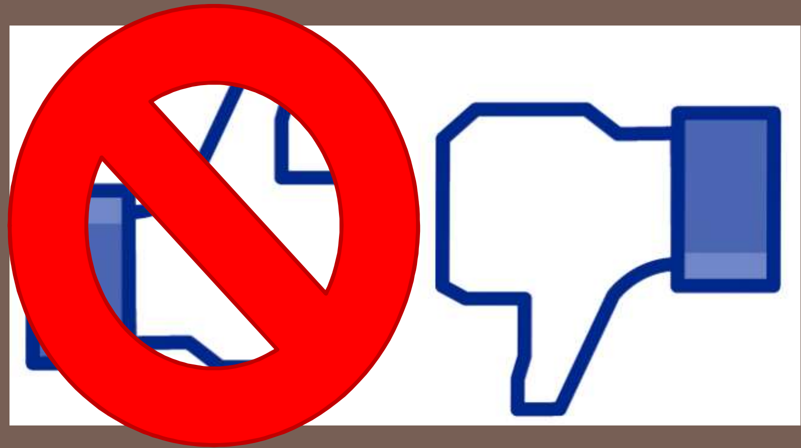
GROUPE HOSPITALIER DU HAVRE



ADJUVANTS DANS LA REHABILITATION

EFFET DE MODE OU INTÉRÊT CLINIQUE ?

Guillaume Prieur – journée GTK/SKR2016

Les adjuvants, un sujet où il y a à dire ….

Adjuvants : définition

L'OBS
LA CONJUGAISON

adjuvant

adj m

1 (pharmacologie) s'ajoutant à un produit

nm

2 (pharmacologie) produit additif sans effet thérapeutique

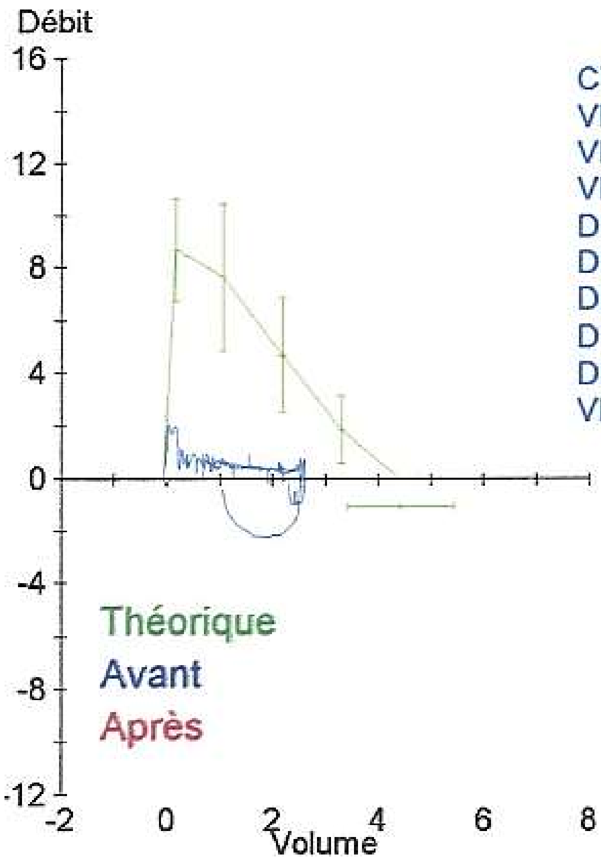
Adjuvants en réhabilitation

- Ventilation Non Invasive (VNI)
- Oxygénothérapie

Ventilation Non Invasive

La VNI à l'effort
Une question de patient sévère…

- M. L
  - 55 ans
  - 1,76 m
  - 56 kg
  - IMC 17,6
  - TDM6 : 50m



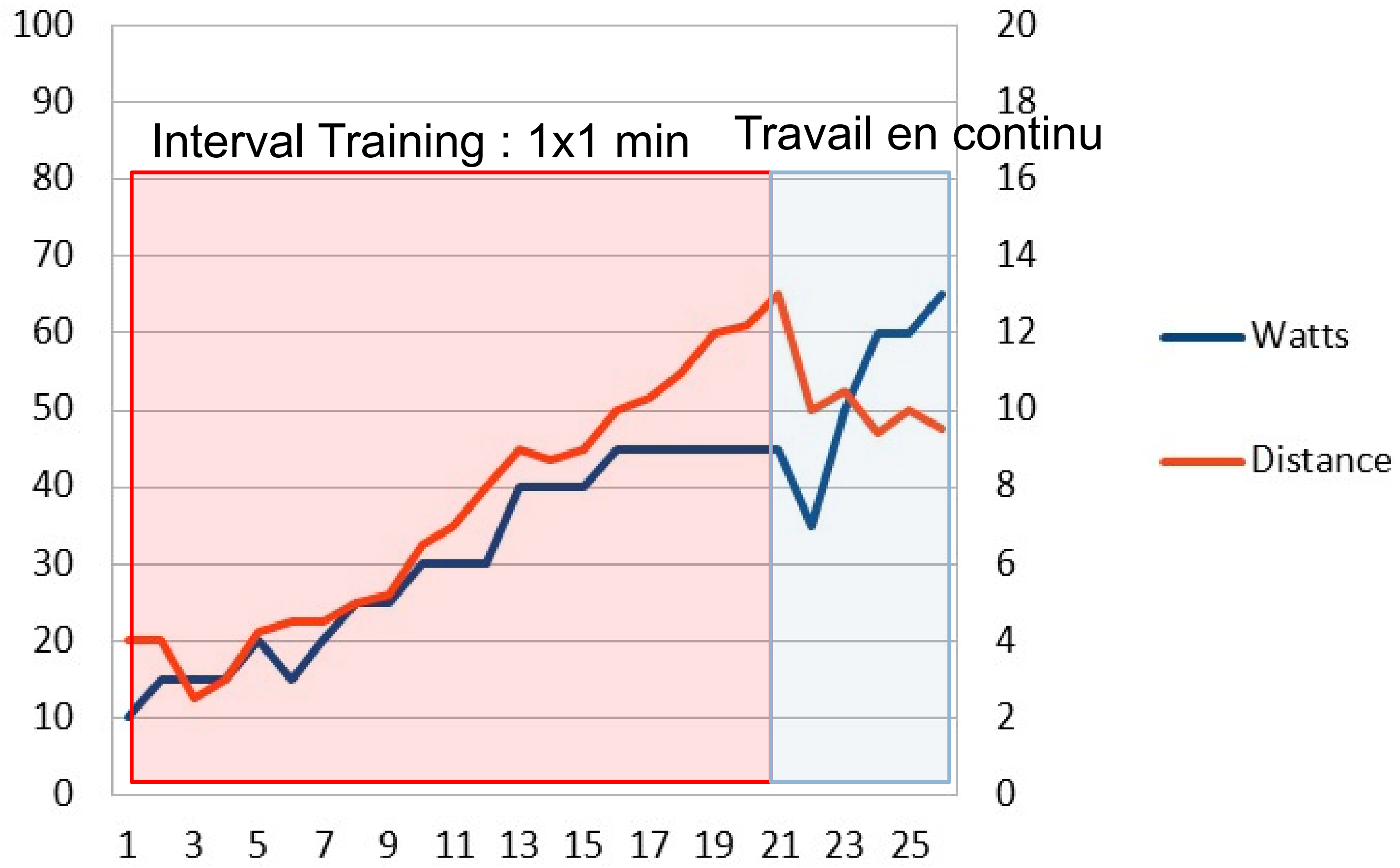
SPIROMETRIE

		Ref	CI	Pre Meas	Pre % Ref
CVF	Litres	4.48	1.00	** 2.67	** 59
VEMS	Litres	3.57	0.84	** 0.77	** 22
VEMS/CVF	%	77	12	** 29	** 37
VEMS/CVL	%			25	
DEM25/75	L/sec	3.79	1.71	** 0.41	** 11
DEM75	L/sec	7.65	2.81	** 0.56	** 7
DEM50	L/sec	4.69	2.17	** 0.46	** 10
DEM25	L/sec	1.88	1.28	** 0.27	** 14
DEP	L/sec	8.71	1.99	** 2.05	** 24
VIMS	Litres				

VOLUMES PULMONAIRES

CPT	Litres	7.14	1.15	** 11.11	** 156
CV	Litres	4.67	0.92	** 3.05	** 65
CI	Litres			1.94	
CRF PL	Litres	3.57	0.99	** 9.17	** 257
CRF N2	Litres	3.57	0.99		
VRE	Litres			1.12	
VR	Litres	2.31	0.67	** 8.05	** 348
VR/CPT	%	35	9	** 73	** 205

Échec de la VNI -> protocole traditionnel



Réhabilitation pendant 9 semaines, 5 fois par semaine

Test de marche post-réhab

Détails SpO2			
% SpO2			
Base	95	Fin	91
Min	90	Max	95
Moyenne	91,8		
Durée de l'analyse			00:06:00
T90 (<90%)		0%	00:00:00
T89 (<89%)		0%	00:00:00
T88 (<88%)		0%	00:00:00
T2 [Δ SpO2 >=2%]			00:05:16
T4 [Δ SpO2 >=4%]			00:03:30

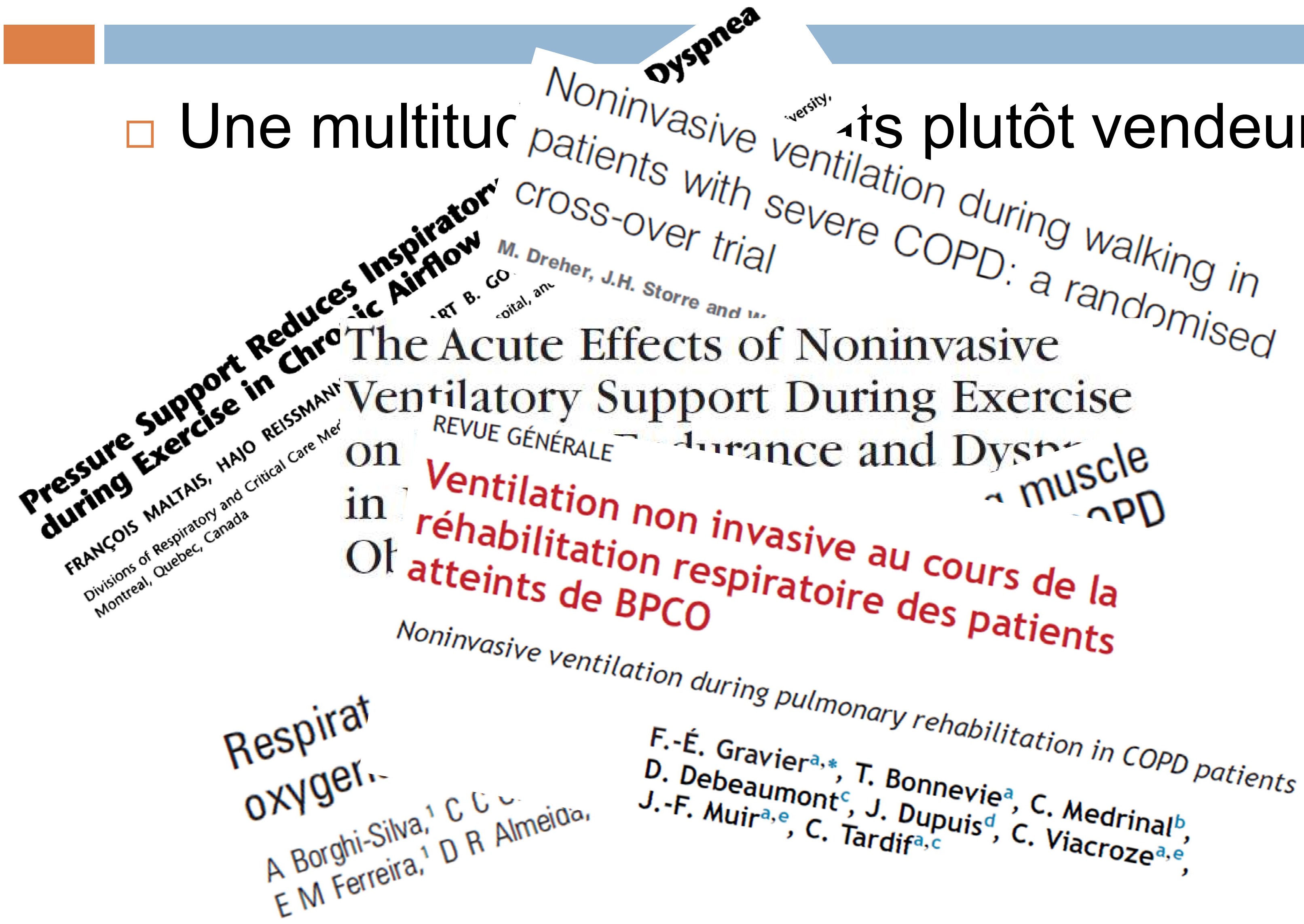
6MWT (Six-Minute Walk Test)				
Distance (m) - VMU 0 - steps 0				
Marché	125	+ 75 mètres		
Prédite	655	(19%)		
Min prédite	502	(25%)		
Distance/AUC	9,1			
O2 --	O2-Gap (L/min)			2,4
		Base	Fin	Chg
Dyspnée (Echelle Borg)		0	7	7
Fatigue (Echelle Borg)		0	7	7
Blood Pressure		--	--	

Détails fréquence pouls			
♥ BPM			
Base	77,3	Fin	94
Min	82	Max	112
Moyenne	95,5		
T 40 (<40 BPM)			0%
T 120 (>120 BPM)			0%
Episodes fréq. pouls			
Bradycardie (<40 BPM)			0
Tachycardia (>120 BPM)			0

-2 points Borg

Effets aigus

- Une multituc ts plutôt vendeurs…



Question : VNI à l’effort

est-ce intéressant sur le long terme ?

Non-invasive ventilation during exercise training for people with chronic obstructive pulmonary disease (Review)

Menadue C, Piper AJ, van ’t Hul AJ, Wong KK

THE COCHRANE COLLABORATION®

Question : VNI à l'effort
est-ce intéressant sur le long terme ?

Analysis 1.3. Comparison 1 Non-invasive ventilation during exercise training versus exercise training alone or exercise training with sham non-invasive ventilation, Outcome 3 Exercise capacity: percentage change.

Review: Non-invasive ventilation during exercise training for people with chronic obstructive pulmonary disease

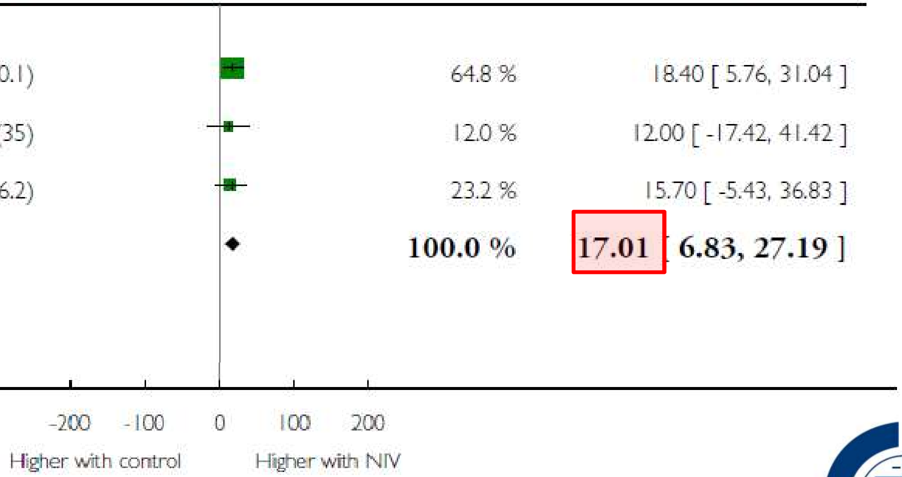
Comparison: 1 Non-invasive ventilation during exercise training versus exercise training alone or exercise training with sham non-invasive ventilation

Outcome: 3 Exercise capacity: percentage change

Study or subgroup	NIV N	NIV Mean(SD)	Control N	Control Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Percentage change peak work rate							
Hawkins 2002	10	32.9 (17.4)	9	14.5 (10.1)		64.8 %	18.40 [5.76, 31.04]
Johnson 2002	11	50 (35.4)	11	38 (35)		12.0 %	12.00 [-17.42, 41.42]
Reuveny 2005	9	24.5 (20.7)	10	8.8 (26.2)		23.2 %	15.70 [-5.43, 36.83]
Subtotal (95% CI)	**30**		**30**			**100.0 %**	**17.01 [6.83, 27.19]**

Heterogeneity: $Chi^2 = 0.17$, df = 2 (P = 0.92); $I^2 = 0.0\%$

Test for overall effect: Z = 3.27 (P = 0.0011)



Augmentation de la charge de travail de 17%

THE COCHRANE COLLABORATION®

Question : VNI à l'effort
est-ce intéressant sur le long terme ?

Analysis 1.1. Comparison 1 Non-invasive ventilation during exercise training versus exercise training alone or exercise training with sham non-invasive ventilation, Outcome 1 Exercise capacity: peak cycle work rate (watts).

Review: Non-invasive ventilation during exercise training for people with chronic obstructive pulmonary disease

Comparison: 1 Non-invasive ventilation during exercise training versus exercise training alone or exercise training with sham non-invasive ventilation

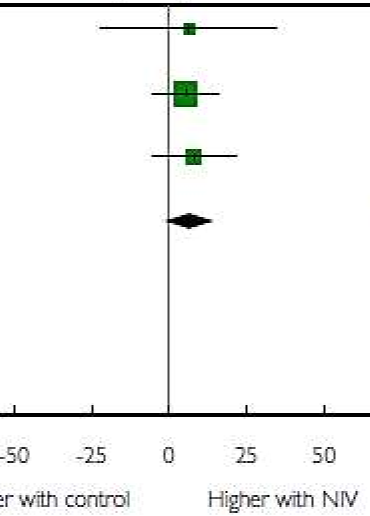
Outcome: 1 Exercise capacity: peak cycle work rate (watts)

Study or subgroup	NIV N	NIV Mean(SD)	Control N	Control Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Bianchi 2002	9	107.8 (36)	10	101.3 (25.6)		8.0 %	6.50 [-21.87, 34.87]
Hawkins 2002	10	57 (13.2)	9	51.7 (10.3)		57.1 %	5.30 [-5.29, 15.89]
Reuveny 2005	9	67 (13)	10	59 (17)		35.0 %	8.00 [-5.53, 21.53]
Total (95% CI)	**28**		**29**			**100.0 %**	**6.34 [-1.66, 14.34]**

Heterogeneity: $Chi^2 = 0.09$, df = 2 (P = 0.95); $I^2 = 0.0\%$

Test for overall effect: Z = 1.55 (P = 0.12)

Test for subgroup differences: Not applicable



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Augmentation de 6 watts…

Question : VNI à l'effort
est-ce intéressant sur le long terme ?

Analysis 1.2. Comparison 1 Non-invasive ventilation during exercise training versus exercise training alone or exercise training with sham non-invasive ventilation, Outcome 2 Exercise capacity: peak VO2 (L/min).

Review: Non-invasive ventilation during exercise training for people with chronic obstructive pulmonary disease

Comparison: 1 Non-invasive ventilation during exercise training versus exercise training alone or exercise training with sham non-invasive ventilation

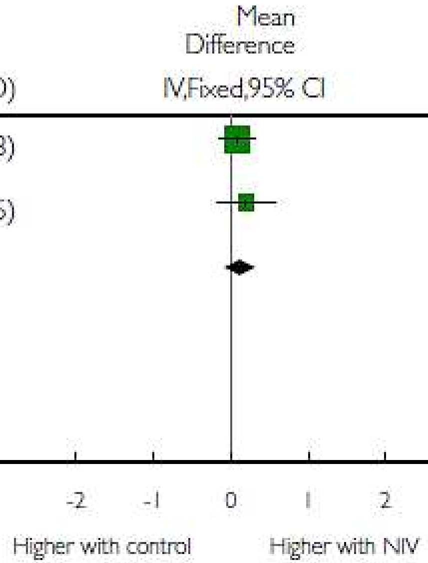
Outcome: 2 Exercise capacity: peak VO_2 (L/min)

Study or subgroup	NIV N	NIV Mean(SD)	Control N	Control Mean(SD)	Weight	Mean Difference IV,Fixed,95% CI
Reuveny 2005	9	1.011 (0.284)	10	0.93 (0.223)	73.1 %	0.08 [-0.15, 0.32]
Toledo 2007	9	1.3 (0.3)	9	1.1 (0.5)	26.9 %	0.20 [-0.18, 0.58]
Total (95% CI)	**18**		**19**		**100.0 %**	**0.12 [-0.08, 0.31]**

Heterogeneity: $Chi^2 = 0.26$, df = 1 (P = 0.61); $I^2 = 0.0\%$

Test for overall effect: Z = 1.14 (P = 0.25)

Test for subgroup differences: Not applicable



Absence de différence sur la Peak VO2

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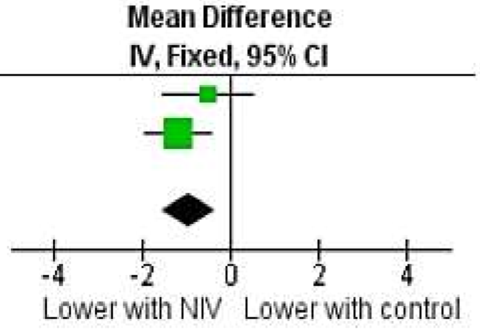
Question : VNI à l'effort
est-ce intéressant sur le long terme ?

Figure 7. Forest plot of comparison: 1 Non-invasive ventilation during exercise training versus exercise training alone or exercise training with sham non-invasive ventilation, outcome: 1.7 Physiological outcomes: Isoload lactate (mmol/L).

	NIV			Control				Mean Difference
Study or Subgroup	**Mean**	**SD**	**Total**	**Mean**	**SD**	**Total**	**Weight**	**IV, Fixed, 95% CI**
Hawkins 2002	2.09	0.38	10	2.61	1.56	9	33.6%	-0.52 [-1.57, 0.53]
Toledo 2007	1.3	0.7	9	2.5	0.9	9	66.4%	-1.20 [-1.94, -0.46]
Total (95% CI)			**19**			**18**	**100.0%**	**-0.97 [-1.58, -0.36]**

Heterogeneity: Chi² = 1.08, df = 1 (P = 0.30); I² = 7%
Test for overall effect: Z = 3.14 (P = 0.002)



Diminution de la lactatémie de 1mmol/L

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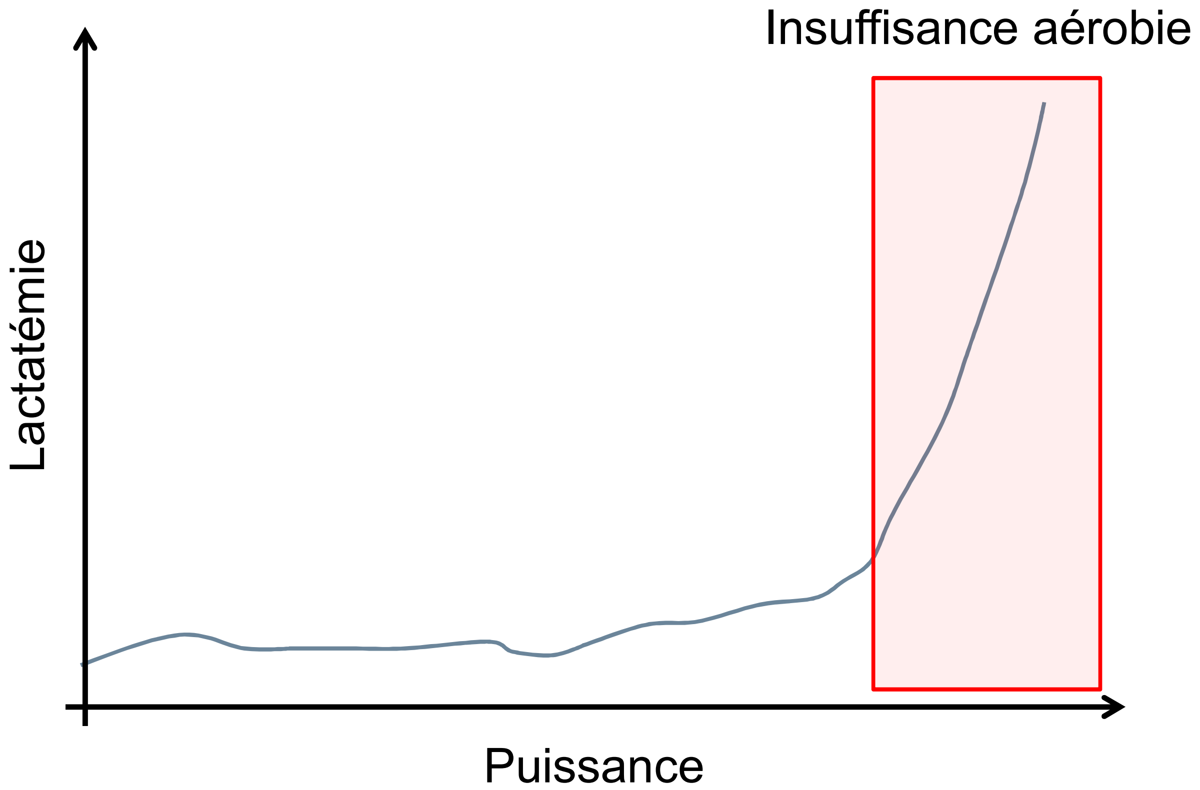
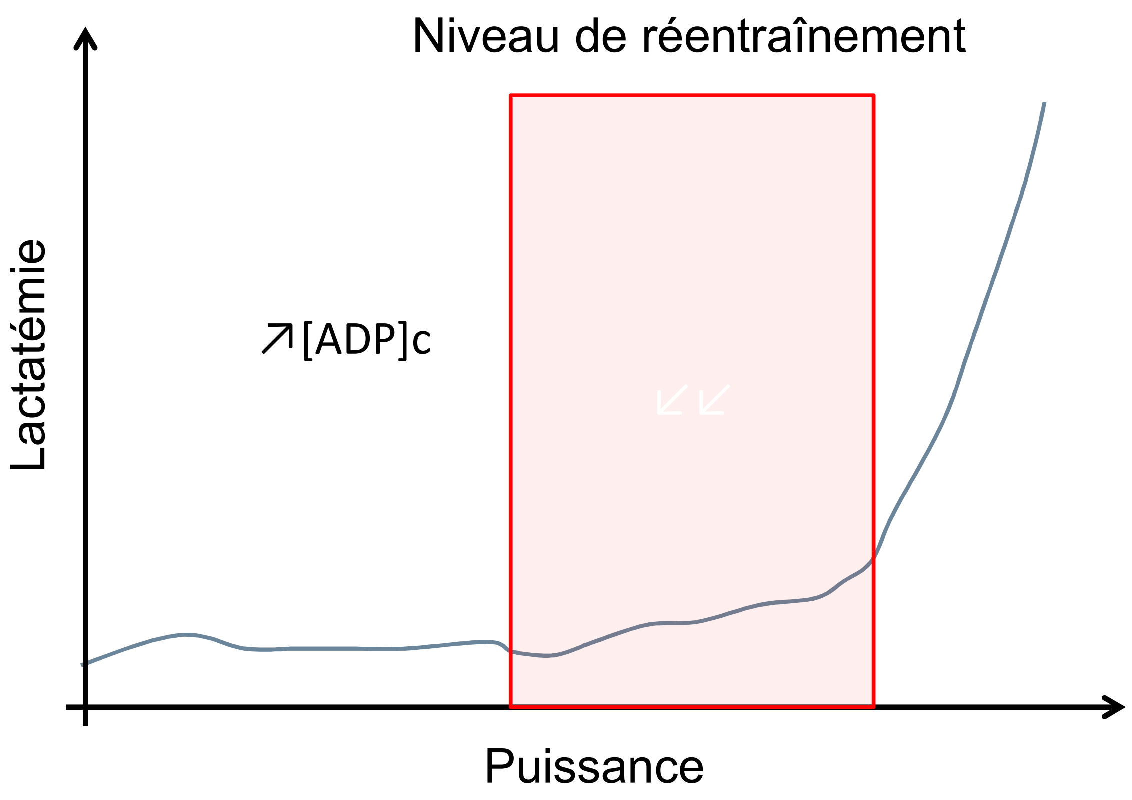
Lactatémie à l’effort



Lactatémie à l'effort



Question : VNI à l’effort
est-ce intéressant sur le long terme ?

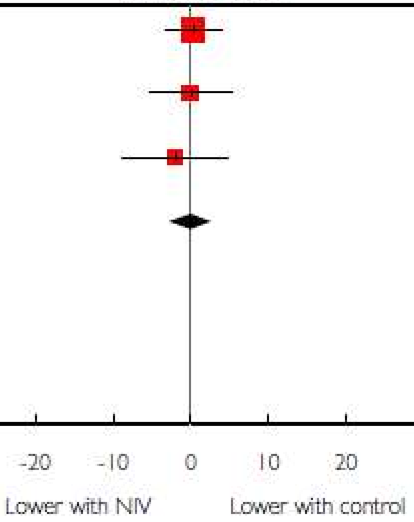
Analysis 1.9. Comparison 1 Non-invasive ventilation during exercise training versus exercise training alone or exercise training with sham non-invasive ventilation, Outcome 9 Physiological outcomes: isotime exercise minute ventilation (L/min).

Study or subgroup	NIV N	Control N	Mean Difference (SE)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Bianchi 2002	9	10	0.375 (1.85)		57.4 %	0.38 [-3.25, 4.00]
Hawkins 2002	10	9	0.13 (2.73)		26.3 %	0.13 [-5.22, 5.48]
van 't Hul 2006	15	0	-2 (3.47)		16.3 %	-2.00 [-8.80, 4.80]
Total (95% CI)	**34**	**19**			**100.0 %**	**-0.08 [-2.82, 2.67]**

Heterogeneity: Chi^2 = 0.37, df = 2 (P = 0.83); I^2 =0.0%

Test for overall effect: Z = 0.05 (P = 0.96)

Test for subgroup differences: Not applicable



Absence de différence sur la ventilation minute

THE COCHRANE COLLABORATION®

Question : VNI à l'effort
est-ce intéressant sur le long terme ?

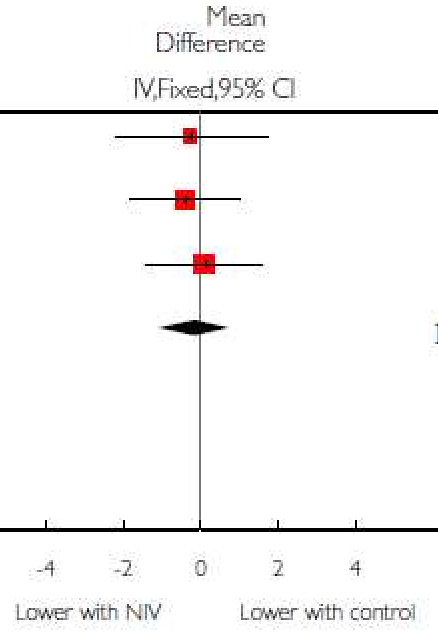
Analysis 1.12. Comparison 1 Non-invasive ventilation during exercise training versus exercise training alone or exercise training with sham non-invasive ventilation, Outcome 12 Dyspnoea: isotime exercise dyspnoea (Borg scale).

Review: Non-invasive ventilation during exercise training for people with chronic obstructive pulmonary disease

Comparison: 1 Non-invasive ventilation during exercise training versus exercise training alone or exercise training with sham non-invasive ventilation

Outcome: 12 Dyspnoea: isotime exercise dyspnoea (Borg scale)

Study or subgroup	NIV N	Control N	Mean Difference (SE)	Weight	Mean Difference IV,Fixed,95% CI
Bianchi 2002	9	10	-0.25 (1)	21.2 %	-0.25 [-2.21, 1.71]
Hawkins 2002	10	9	-0.4 (0.71)	42.1 %	-0.40 [-1.79, 0.99]
Toledo 2007	9	9	0.1 (0.76)	36.7 %	0.10 [-1.39, 1.59]
Total (95% CI)	**28**	**28**		**100.0 %**	**-0.18 [-1.09, 0.72]**



Heterogeneity: $Chi^2 = 0.24$, df = 2 (P = 0.89); $I^2 = 0.0\%$

Test for overall effect: Z = 0.40 (P = 0.69)

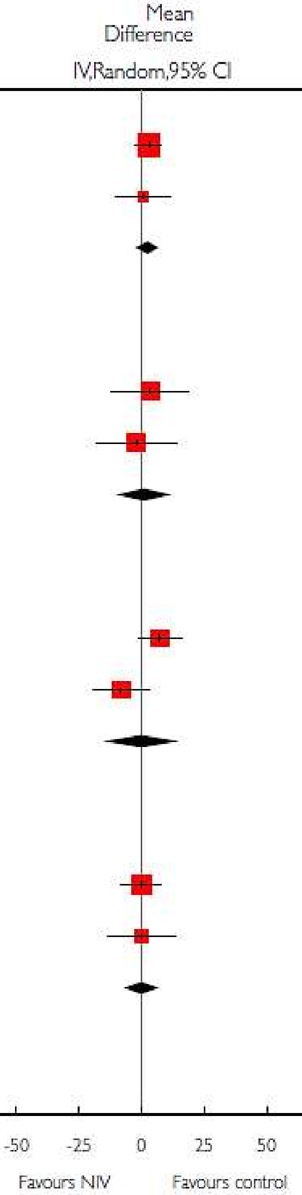
Test for subgroup differences: Not applicable

Absence de différence sur la dyspnée

THE COCHRANE COLLABORATION®

Analysis 1.5. Comparison 1 Non-invasive ventilation during exercise training versus exercise training alone or exercise training with sham non-invasive ventilation, Outcome 5 Health-related quality of life: St George's Respiratory Questionnaire.

Study or subgroup	NIV N	Control N	Mean Difference (SE)	Weight	Mean Difference IV,Random,95% CI
1 SGRQ: total score (points)					
Bianchi 2002	9	10	2.8 (2.7)	80.6 %	2.80 [-2.49, 8.09]
van 't Hul 2006	15	14	1 (5.5)	19.4 %	1.00 [-9.78, 11.78]
Subtotal (95% CI)	**24**	**24**		**100.0 %**	**2.45 [-2.30, 7.20]**
Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.09$, df = 1 (P = 0.77); $I^2 = 0.0\%$					
Test for overall effect: Z = 1.01 (P = 0.31)					
2 SGRQ: symptoms (points)					
Bianchi 2002	9	10	3.45 (7.78)	52.6 %	3.45 [-11.80, 18.70]
van 't Hul 2006	15	14	-2 (8.2)	47.4 %	-2.00 [-18.07, 14.07]
Subtotal (95% CI)	**24**	**24**		**100.0 %**	**0.87 [-10.19, 11.93]**
Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.23$, df = 1 (P = 0.63); $I^2 = 0.0\%$					
Test for overall effect: Z = 0.15 (P = 0.88)					
3 SGRQ: activity (points)					
Bianchi 2002	9	10	7.3 (4.5)	52.6 %	7.30 [-1.52, 16.12]
van 't Hul 2006	15	14	-8 (5.7)	47.4 %	-8.00 [-19.17, 3.17]
Subtotal (95% CI)	**24**	**24**		**100.0 %**	**0.05 [-14.92, 15.02]**
Heterogeneity: $Tau^2 = 90.67$; $Chi^2 = 4.44$, df = 1 (P = 0.04); $I^2 = 77\%$					
Test for overall effect: Z = 0.01 (P = 0.99)					
4 SGRQ: impacts (points)					
Bianchi 2002	9	10	0.15 (4.1)	74.5 %	0.15 [-7.89, 8.19]
van 't Hul 2006	15	14	0 (7)	25.5 %	0.0 [-13.72, 13.72]
Subtotal (95% CI)	**24**	**24**		**100.0 %**	**0.11 [-6.82, 7.05]**
Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.00$, df = 1 (P = 0.99); $I^2 = 0.0\%$					
Test for overall effect: Z = 0.03 (P = 0.97)					



Absence de différence sur la QDV

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Question : VNI à l'effort
est-ce intéressant sur le long terme ?

Population

14 patients

VEMS 31,5%

RCT VNI versus VS

Noninvasive Ventilation During Exercise Training Improves Exercise Tolerance in Patients With Chronic Obstructive Pulmonary Disease

Frédéric Costes, MD, PhD; André Agresti, MD; Isabelle Court-Fortune, MD; Frédéric Roche, MD, PhD; Jean-Michel Vergnon, MD; Jean Claude Barthélémy, MD, PhD

- Programme :
  - 3 fois par semaine
  - 8 semaines
  - 30 minutes cyclo à 60% PMA
- Paramètres :
  - Ai : maximale tolérée par le patient
  - Pep : 4 à 8 cmH2O

Question : VNI à l'effort

est-ce intéressant sur le long terme ?

Table 2 • VALUES OBTAINED AT PEAK EXERCISE DURING THE INCREMENTAL EXERCISE TEST IN THE TWO GROUPS

	Noninvasive Ventilation Group		Control Group	
	Pre-training	*Post-training*	*Pre-training*	*Post-training*
Workload, W	54.3 (21.5)	65.7 (15.1)*	54.3 (9.8)	68.6 (24.1)*
VO_2, mL.min^{-1}	830 (192)	980 (274)*	943 (175)	965 (249)
mL.min^{-1}. kg^{-1}	11.3 (1.6)	13.3 (2.6)	12.3 (1.6)	12.7 (2.5)
VCO_2, mL.min^{-1}	806 (201)	895 (268)	925 (178)	992 (274)
RQ	0.97 (0.07)	0.91 (0.08)	0.98 (0.04)	1.02 (0.06)
HR, min^{-1}	129 (9)	131 (10)	134 (17)	131 (15)
VE, L.min^{-1}	32.1 (7.3)	32.3 (6.7)	31.3 (5.4)	34.0 (8.4)
VE/VO_2	39.8 (7.8)	35.1 (10.6)*	33.6 (6.6)	36.0 (7.0)
VE/VCO_2	41.3 (7.0)	38.2 (10.4)	34.5 (6.7)	35.2 (6.7)
RR, min^{-1}	34 (11)	34 (10)	32 (8)	31 (9)
Vd/Vt	0.42 (0.03)	0.36 (0.06)†	0.36 (0.04)	0.38 (0.03)
ΔSaO_2, %	-10 (9)	-8 (7)	-11 (8)	-9 (6)
ΔPaO_2, mm Hg	-10.4 (11.8)	-11.8 (10.6)	-17.0 (5.2)	-13.8 (7.7)
$\Delta PaCO_2$, mm Hg	8.4 (3.5)	8.2 (2.9)	9.5 (5.3))	8.2 (5.0)
Lactate, mmol.L^{-1}	4.0 (0.9)	4.2 (1.0)	3.6 (0.9)	3.8 (1.6)

VO_2, oxygen consumption; VCO_2, carbon dioxide output; RQ, respiratory quotient; HR, heart rate; VE, minute ventilation; RR, respiratory rate, Vd/Vt, dead space to tidal volume ratio; SaO_2, arterial oxygen saturation; PaO_2, arterial oxygen pressure; $PaCO_2$, arterial carbon dioxide pressure.

*$P < .05$.

† $P < .01$.

Aucune différence significative sur les outcomes !

Question : VNI à l'effort
est-ce intéressant sur le long terme ?

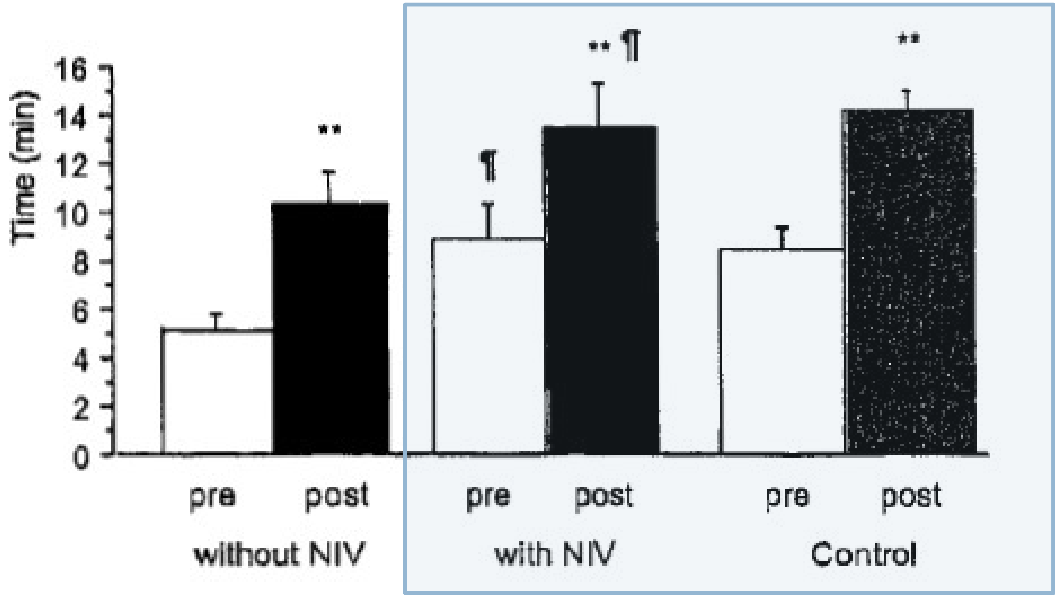


Figure 2. Change in constant work rate exercise duration with training. The percentage of increased tolerance did not differ between the two groups.. ** $P < .01$ with training. ¶ $P < .05$ with noninvasive positive pressure ventilation.

Temps d'endurance similaire entre test d'endurance avec VNI versus VS

Question : VNI à l'effort

est-ce intéressant sur le long terme ?

Groupe VNI

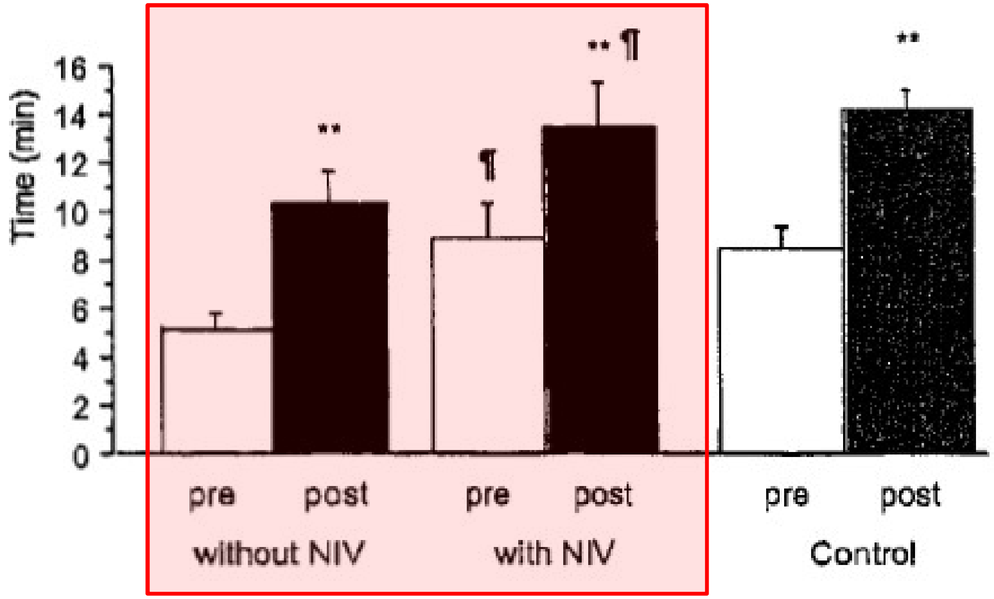


Figure 2. Change in constant work rate exercise duration with training. The percentage of increased tolerance did not differ between the two groups.. ** $P < .01$ with training. ¶ $P < .05$ with noninvasive positive pressure ventilation.

Réentraînement sous VNI -> Désadaptation à l'effort ?

Question : VNI à l'effort
est-ce intéressant sur le long terme ?

Effects of Training With Heliox and Noninvasive Positive Pressure Ventilation on Exercise Ability in Patients With Severe COPD*

James E. Johnson, MD; Daniel J. Gavin, MD, MAJ USAR, MC; and Stacy Adams-Dramiga, MA

- 51 patients VEMS 32,1%
- RCT Control vs Hélium vs VNI
  - Hélium =>21% O2 – 79% Hélium 10L/min via masque
  - VNI => Ai (8-12cmH2O) ; Pep (2cmH2O)
- Programme 8 semaines
  - 2 semaines de test sur tapis de marche
    - Début à 1,6/3 km/h max à 5km/h (↗toute les 4min)
  - 6 semaines de réentraînement
  - 2/semaine 20 min 50 à 60% max

CHEST

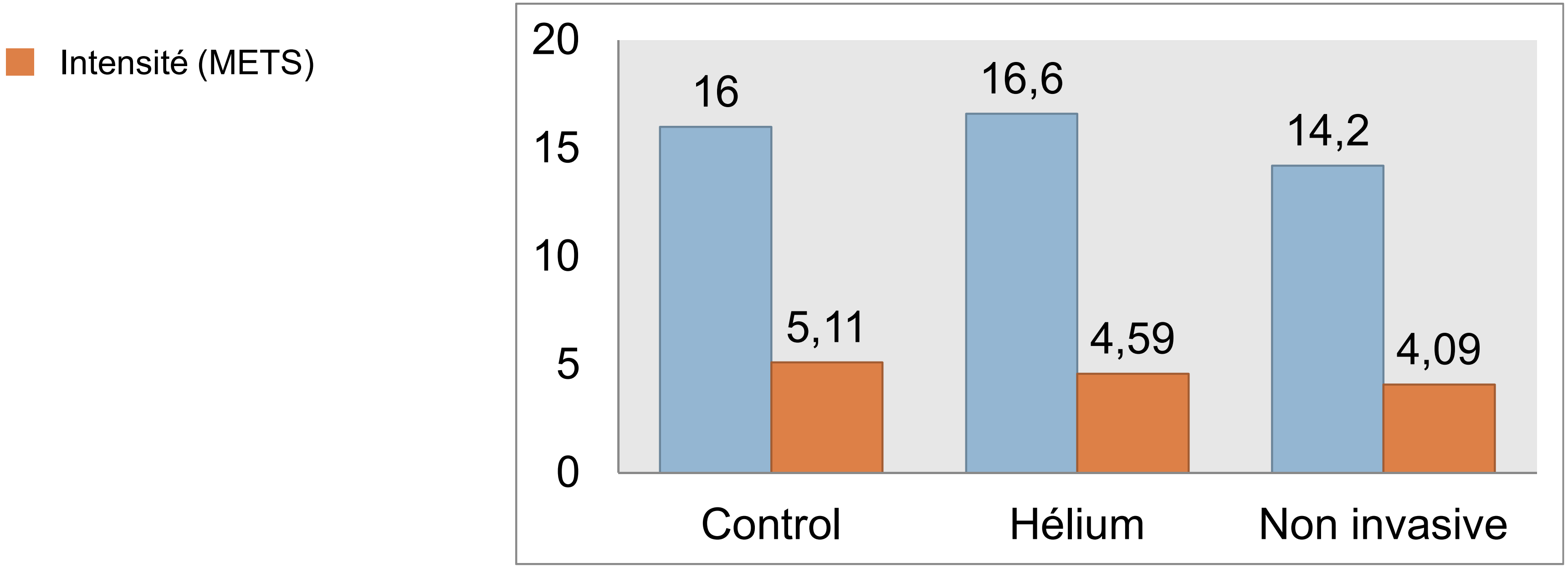
Question : VNI à l'effort
est-ce intéressant sur le long terme ?

Effects of Training With Heliox and Noninvasive Positive Pressure Ventilation on Exercise Ability in Patients With Severe COPD*

CHEST

James E. Johnson, MD; Daniel J. Gavin, MD, MAJ USAR, MC; and Stacy Adams-Dramiga, MA

<u>Test du tapis de marche final sans assistance</u>



En résumé…

- Des effets bénéfiques de la VNI pendant la séance
  - Charge de travail plus importante

- Après un programme de réhabilitation

  ⇒ Aucun bénéfice pour la VNI sur les tests réalisés **sans VNI** en fin de programme

Oxygénothérapie

Oxygène en Adjuvant

Faut-il supplémenter les patients atteints de BPCO en oxygène au cours du réentrainement ?

Faut-il supplémenter les patients atteints de BPCO en oxygène au cours du réentrainement ?

American Thoracic Society Documents

An Official American Thoracic Society/European Respiratory Society Statement: Key Concepts and Advances in Pulmonary Rehabilitation

Although methodological differences may help explain these differences in results (37), the evidence to date does not appear to provide unequivocal support for the widespread use of oxygen supplementation during exercise training for all individuals with COPD (205), apart from those already receiving long-term oxygen therapy.

Aucune preuve à l’utilisation généralisée de l’oxygénothérapie en réhabilitation

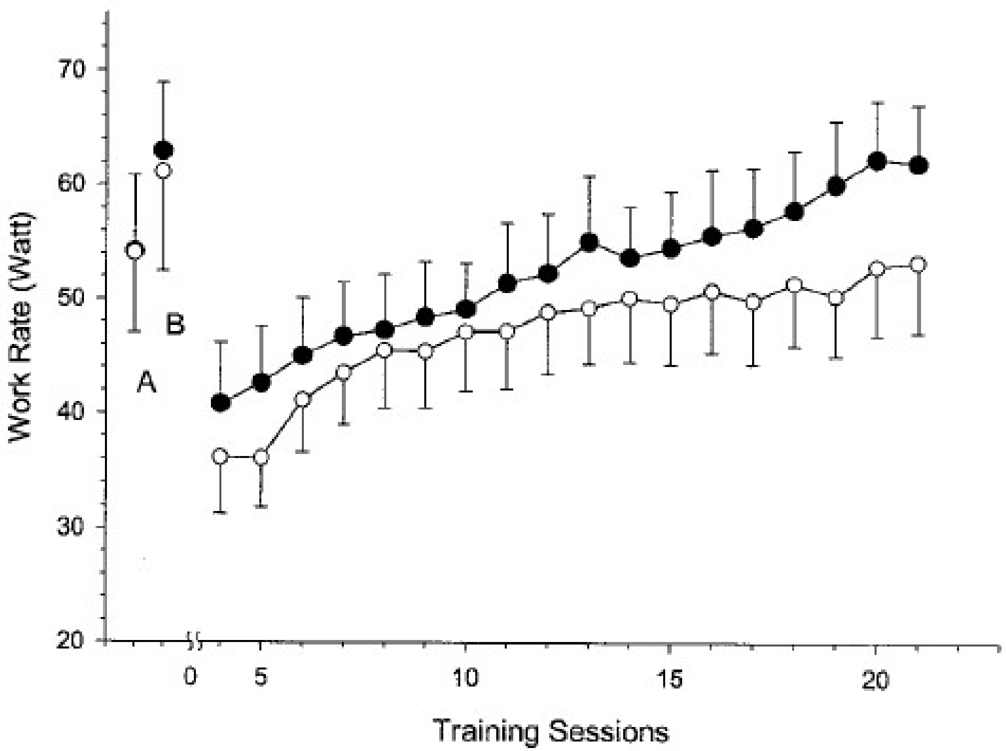
Question à un ami

- Francis, pourquoi penses-tu que la supplémentation en O_2 peut être bénéfique pour les patients ?

Car la supplémentation en O2 permet au patient de travailler à une plus haute intensité

Question à un ami

- Francis, pourquoi penses-tu que la supplémentation en O_2 peut être bénéfique pour les patients ?



Emtner, Am J Respir Crit Care Med Vol 168. pp 1034–1042, 2003

Oxygène en Adjuvant

L'augmentation de la charge de travail grâce à la supplémentation en O_2 est-elle bénéfique à long terme ?

Bénéfice de l'O_2 chez les patients dyspnéique

Symptomatic oxygen for non-hypoxaemic chronic obstructive pulmonary disease (Review)

Uronis H, McCrory DC, Samsa G, Currow D, Abernethy A

THE COCHRANE COLLABORATION®

Bénéfices de l'O_2 chez les patients dyspnéique

Symptomatic oxygen for non-hypoxaemic chronic obstructive pulmonary disease (Review)

Uronis H, McCrory DC, Samsa G, Currow D, Abernethy A

- 31 études retenues (702 patients)
- Patients novice d'OLD
- RCT comparant O2 vs air médical

THE COCHRANE COLLABORATION®

Bénéfices de l'O2 chez les patients dyspnéique

Comparison 1. Oxygen versus air

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Breathlessness - all trials	21		Std. Mean Difference (Random, 95% CI)	-0.37 [-0.50, -0.24]
2 Breathlessness - subgroup analysis - study focus	21		SMD (Random, 95% CI)	Subtotals only
2.1 Studies with primary focus = sensation	2		SMD (Random, 95% CI)	-0.39 [-0.66, -0.12]
2.2 Studies with primary focus = function	12		SMD (Random, 95% CI)	-0.45 [-0.61, -0.30]
2.3 Studies with primary focus = both	7		SMD (Random, 95% CI)	-0.32 [-0.67, 0.03]
3 Breathlessness - subgroup analysis - short burst or not	21		SMD (Random, 95% CI)	Subtotals only
3.1 Studies not using short-burst oxygen	17		SMD (Random, 95% CI)	-0.46 [-0.59, -0.33]
3.2 Studies using short-burst oxygen	4		SMD (Random, 95% CI)	0.01 [-0.26, 0.28]
4 Breathlessness - subgroup analysis - saturation on exertion	21		SMD (Random, 95% CI)	Subtotals only
4.1 Studies with exertional desaturation	16		SMD (Random, 95% CI)	-0.33 [-0.46, -0.20]
4.2 Studies with no exertional desaturation	5		SMD (Random, 95% CI)	-0.69 [-1.04, -0.34]

Des résultats significatifs, mais non pertinent ….

Bénéfices de l'O_2 pendant un programme de réhabilitation respiratoire

Oxygen therapy during exercise training in chronic obstructive pulmonary disease (Review)

Nonoyama M, Brooks D, Lacasse Y, Guyatt GH, Goldstein R

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Bénéfices de l'O_2 pendant un programme de réhabilitation respiratoire

Oxygen therapy during exercise training in chronic obstructive pulmonary disease (Review)

Nonoyama M, Brooks D, Lacasse Y, Guyatt GH, Goldstein R

- 5 RCT (108 patients)
- programme REE BPCO avec versus sans O2
- PaO2 8,5 à 10,4 kPa
- Supplémentation de 3,5 à 5 L/min

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Bénéfices de l'O_2 pendant un programme de réhabilitation respiratoire

Amélioration	Pas d'amélioration

Amélioration

- ↗du temps d'endurance
  - (test cyclo 80% PMA) de 2,68 min
- ↘de la dyspnée
  - (test cyclo 80% PMA) de 1,22 points (Borg)

Pas d'amélioration

- Charge maximale de travail (watts)
- VO_2 à iso-temps
- VO_2max
- Dyspnée (TDM6, test incrémental, Shuttle walk test)
- SpO_2/PaO_2 (test d'endurance 80%, TDM6, Shuttle walk test, test incrémental)
- Qualité de vie (SF36-CRQ)

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Depuis …

Effects of Oxygen Supply During Training on Subjects With COPD Who Are Normoxemic at Rest and During Exercise: A Blinded Randomized Controlled Trial

Marc Spielmanns MD, Chantal Fuchs-Bergsma MD, Aurelia Winkler MD, Gabriele Fox MD, Stefan Krüger MD, and Klaus Baum PhD

Différence de 10m au TDM6

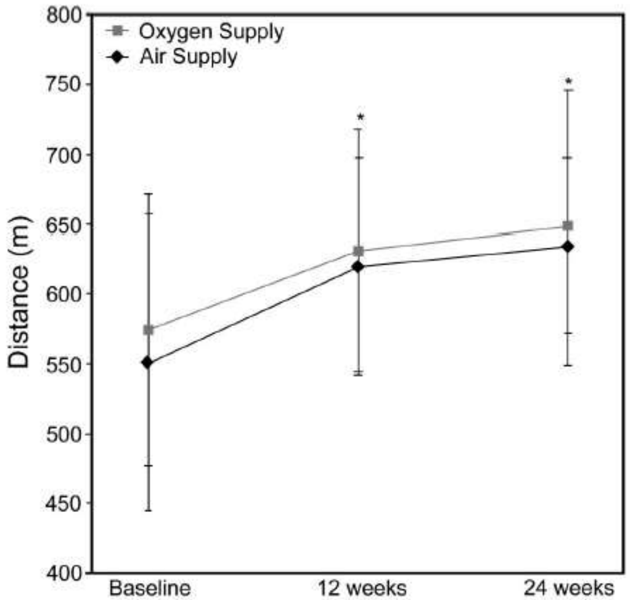

Fig. 2. The 6-min walk distance before (baseline) and after 12 and 24 weeks of training. Data are shown as mean ± SD. * Significant difference from baseline.

36 patients BPCO - VEMS 43,5%
SpO2 > 90% au repos et à l'exercice
24 semaines, 3 fois/semaine, 30 min,
70 à 85% PMA

Depuis …

CHEST Original Research
COPD

Does a Low-Density Gas Mixture or Oxygen Supplementation Improve Exercise Training in COPD?

Debora Scorsone, PhD; Stefano Bartolini, MD; Riccardo Saporiti, MD; Fulvio Braido, MD; Michele Baroffio, PhD; Riccardo Pellegrino, MD; Vito Brusasco, MD; and Emanuele Crimi, MD

- 30 patients BPCO - VEMS 48,6%
- PaO2 > 75 mmHg
- 8 semaines, 3 fois/semaine, 30 min, 40 à 80% PMA en 2/3 semaines

Table 2—*Results of Incremental Load Exercise Test Before and After Training*

Measure	Air	$Heliox_{60:40}$	FiO2 40% Supplemental O_2	ANOVA Between Groups	ANOVA Effects of Training
Peak workload, W					
Before	82 ± 33	66 ± 16	67 ± 21	0.372	0.0001
After	92 ± 35	81 ± 24	76 ± 25		
$\dot{V}O_2$peak, L/min					
Before	1.35 ± 0.60	1.19 ± 0.36	0.95 ± 0.31	0.159	0.146
After	1.41 ± 0.57	1.18 ± 0.38	1.05 ± 0.30		
$\dot{V}E$peak, L/min					
Before	40.4 ± 13.9	43.1 ± 18.0	34.0 ± 8.7	0.311	0.176
After	45.7 ± 17	41.6 ± 12.5	36.0 ± 8.0		
BFpeak, per min					
Before	32 ± 5	33 ± 9	34 ± 6	0.955	0.758
After	32 ± 5	32 ± 7	32 ± 6		
HRpeak, per min					
Before	119 ± 19	[illegible] ± 16	119 ± 25	0.850	0.897
After	120 ± 15	116 ± 22	118 ± 21		
$\dot{V}O_2$peak/HRpeak					
Before	11.4 ± 5.0	10.8 ± 4.3	9.2 ± 2.4	0.217	0.535
After	11.8 ± 4.2	10.5 ± 3.5	9.1 ± 3.2		
EELVpeak, %TLC					
Before	74 ± 9	73 ± 7	78 ± 5	0.891	0.914
After	79 ± 6	74 ± 9	73 ± 12		
EILVpeak, %TLC					
Before	93 ± 6	92 ± 3	95 ± 4	0.674	0.348
After	95 ± 5	92 ± 7	92 ± 7		
Dyspnea, units					
Before	7 ± 3	7 ± 2	7 ± 3	0.147	0.287
After	4 ± 2	8 ± 3	6 ± 3		
Leg discomfort, units					
Before	8 ± 2	7 ± 3	9 ± 1	0.799	0.059
After	7 ± 2	7 ± 4	7 ± 2		
$\dot{V}E/\dot{V}CO_2$@AT					
Before	31.6 ± 5.7	28.5 ± 7.8	31.0 ± 6.6	0.545	0.441
After	32.0 ± 10	27.9 ± 4.3	28.8 ± 6.7		

ANOVA = analysis of variance; BFpeak = breathing frequency at the peak; EELVpeak = end-expiratory lung volume at the peak; EILVpeak = end-inspiratory lung volume at the peak; HRpeak = heart rate at the peak; $\dot{V}E$peak = minute ventilation at the peak; $\dot{V}E/\dot{V}CO_2$@AT = minute ventilation to CO_2 production ratio at ventilatory anaerobic threshold; $\dot{V}O_2$peak = oxygen uptake at the peak; $\dot{V}O_2$peak/HRpeak = oxygen pulse at the [illegible] Table 1 legend for expansion of other abbreviations.

Aucune amélioration sur les Outcomes !

CHEST

Table 2—*Results of Incremental Load Exercise Test Before and After Training*

Measure	Air	$Heliox_{60:40}$	FiO2 40% Supplemental O_2	ANOVA: Between Groups	ANOVA: Effects of Training
Peak workload, W					
Before	82 ± 33	66 ± 16	67 ± 21	0.372	0.0001
After	92 ± 35	81 ± 24	76 ± 25		
$\dot{V}O_2$peak, L/min					
Before	1.35 ± 0.60	1.19 ± 0.36	0.95 ± 0.31	0.159	0.146
After	1.41 ± 0.57	1.18 ± 0.38	1.05 ± 0.30		
$\dot{V}E$peak, L/min					
Before	40.4 ± 13.9	43.1 ± 18.0	34.0 ± 8.7	0.311	0.176
After	45.7 ± 17	41.6 ± 12.5	36.0 ± 8.0		
BFpeak, per min					
Before	32 ± 5	33 ± 9	34 ± 6	0.955	0.758
After	32 ± 5	32 ± 7	32 ± 6		
HRpeak, per min					
Before	119 ± 19	114 ± 16	119 ± 25	0.850	0.897
After	120 ± 15	116 ± 22	118 ± 21		
$\dot{V}O_2$peak/HRpeak					
Before	11.4 ± 5.0	10.8 ± 4.3	8.2 ± 2.9	0.217	0.535
After	11.8 ± 4.2	10.5 ± 3.5	9.1 ± 3.2		
EELVpeak, %TLC					
Before	74 ± 9	73 ± 7	78 ± 5	0.801	0.914
After	79 ± 6	74 ± 9	73 ± 12		
EILVpeak, %TLC					
Before	93 ± 6	92 ± 3	95 ± 4	0.674	0.948
After	95 ± 5	92 ± 7	92 ± 7		
Dyspnea, units					
Before	7 ± 3	7 ± 2	7 ± 3	0.147	0.287
After	4 ± 2	8 ± 3	6 ± 3		
Leg discomfort, units					
Before	8 ± 2	7 ± 3	9 ± 1	0.799	0.059
After	7 ± 2	7 ± 4	7 ± 2		
$\dot{V}E/\dot{V}CO_2$@AT					
Before	31.6 ± 5.7	28.5 ± 7.8	31.0 ± 6.6	0.545	0.441
After	32.0 ± 10	27.9 ± 4.3	28.8 ± 6.7		

ANOVA = analysis of variance; BFpeak = breathing frequency at the peak; EELVpeak = end-expiratory lung volume at the peak; EILVpeak = end-inspiratory lung volume at the peak; HRpeak = heart rate at the peak; $\dot{V}E$peak = minute ventilation at the peak; $\dot{V}E/\dot{V}CO_2$@AT = minute ventilation to CO_2 production ratio at ventilatory anaerobic threshold; $\dot{V}O_2$peak = oxygen uptake at the peak; $\dot{V}O_2$peak/HRpeak = oxygen pulse at the
Table 1 legend for expansion of other abbreviations.

Table 3—*Results of Constant-Load Exercise Test at Isotime (100% of Pretraining)*

Measure	Air	$Heliox_{60:40}$	Supplemental O_2	ANOVA Between Groups	ANOVA Effects of Training
Time, min	7.6 ± 4.9	5.8 ± 2.6	6.9 ± 4.4	0.635	…
$\dot{V}O_2$, L/min					
Before	1.28 ± 0.49	1.15 ± 0.28	0.90 ± 0.24	0.069	0.097
After	1.27 ± 0.51	1.16 ± 0.31	0.89 ± 0.18		
$\dot{V}E$, L/min					
Before	43.0 ± 15.2	38.6 ± 9.1	33.2 ± 9.5	0.136	0.024
After	40.7 ± 14.0	38.2 ± 8.8	31.0 ± 7.2		
BF, per min					
Before	[illegible]	30 ± 9	30 ± 6	0.80	0.050
After	28 ± 4	28 ± 9	27 ± 6		
V_T, L					
Before	1.43 ± 0.45	1.34 ± 0.31	1.15 ± 0.30	0.131	0.168
After	1.46 ± 0.45	1.27 ± 0.42	1.07 ± 0.23		
HR, per min					
Before	118 ± 15	114 ± 17	[illegible]	0.939	0.040
After	111 ± 15	111 ± 15	113 ± 18		
EELV, % TLC					
Before	75 ± 9	75 ± 7	75 ± 7	0.788	0.070
After	75 ± 9	71 ± 9	72 ± 11		
EILV, % TLC					
Before	94 ± 2	92 ± 4	92 ± 5	0.535	[illegible]
After	94 ± 4	90 ± 9	91 ± 7		
Dyspnea, units					
Before	8 ± 3	6 ± 3	7 ± 3	0.528	0.006
After	5 ± 3	5 ± 3	5 ± 1		
Leg discomfort, units					
Before	7 ± 2	7 ± 3	8 ± 2	0.359	0.0007
After	6 ± 3	4 ± 3	6 ± 2		

EELV = end-expiratory lung volume; EILV = end-inspiratory lung volume; HR = heart rate; $\dot{V}E$ = minute ventilation; $\dot{V}O_2$ = oxygen uptake; V_T = tidal volume. See Table 1 and 2 legends for expansion of other abbreviations.

Aucune amélioration sur les Outcomes !

CHEST

Table 3—*Results of Constant-Load Exercise Test at Isotime (100% of Pretraining)*

Measure	Air	$Heliox_{60:40}$	Supplemental O_2	ANOVA: Between Groups	ANOVA: Effects of Training
Time, min	7.6 ± 4.9	5.8 ± 2.6	6.9 ± 4.4	0.635	...
$\dot{V}O_2$, L/min					
Before	1.28 ± 0.49	1.15 ± 0.28	0.90 ± 0.24	0.069	0.097
After	1.27 ± 0.51	1.16 ± 0.31	0.89 ± 0.18		
$\dot{V}E$, L/min					
Before	43.0 ± 15.2	38.6 ± 9.1	33.2 ± 9.5	0.136	0.024
After	40.7 ± 14.0	38.2 ± 8.8	31.0 ± 7.2		
BF, per min					
Before	30 ± 3	30 ± 9	30 ± 6	0.80	0.050
After	28 ± 4	28 ± 9	27 ± 6		
VT, L					
Before	1.43 ± 0.45	1.34 ± 0.34	1.15 ± 0.30	0.131	0.168
After	1.46 ± 0.45	1.27 ± 0.42	1.07 ± 0.23		
HR, per min					
Before	118 ± 15	114 ± 17	116 ± 25	0.939	0.040
After	111 ± 15	111 ± 15	113 ± 18		
EELV, % TLC					
Before	75 ± 9	75 ± 7	75 ± 7	0.788	0.070
After	75 ± 9	71 ± 9	72 ± 11		
EILV, % TLC					
Before	94 ± 2	92 ± 4	92 ± 5	0.535	0.281
After	94 ± 4	90 ± 9	91 ± 7		
Dyspnea, units					
Before	8 ± 3	6 ± 3	7 ± 3	0.528	0.006
After	5 ± 3	5 ± 3	5 ± 1		
Leg discomfort, units					
Before	7 ± 2	7 ± 3	8 ± 2	0.359	0.0007
After	6 ± 3	4 ± 3	6 ± 2		

EELV = end-expiratory lung volume; EILV = end-inspiratory lung volume; HR = heart rate; $\dot{V}E$ = minute ventilation; $\dot{V}O_2$ = oxygen uptake; VT = tidal volume. See Table 1 and 2 legends for expansion of other abbreviations.

L'O2 augmente t-elle les activités à la maison ?

THORAX

A randomised trial of domiciliary, ambulatory oxygen in patients with COPD and dyspnoea but without resting hypoxaemia

Rosemary P Moore,[1,2,3,4,5] David J Berlowitz,[1,2,3,4,5] Linda Denehy,[4] Jeffrey J Pretto,[1,6] Danny J Brazzale,[1,2] Ken Sharpe,[7] Bruce Jackson,[8] Christine F McDonald[1,2,5]

N = 143
VEMS : 47%
PaO_2 : 71 mmHg
Double aveugle
6L d'O_2 ou d'air
12 semaines

Table 3 Functional capacity and performance outcomes

	Time (weeks)	Air mean (SD)	Oxygen mean (SD)	ANOVA: p Values Treatment
6MWD (m)	Baseline	341 (88.9)	341 (93.2)	0.843
	4	359 (95.9)	348 (99.9)	
	12	357 (100.0)	352 (114.0)	
Stand/walk time (h/week)	Baseline	3.7 (15.2)	38.7 (15.2)	0.341
	4	37.8 (14.7)	38.8 (15.7)	
	12	36.7 (15.5)	40.2 (16.0)	
Outings time (h/week)	Baseline	15.9 (10.4)	19.2 (12.4)	0.197*
	4	15.3 (10.1)	19.1 (13.9)	
	12	16.4 (11.2)	17.6 (12.8)	
Pedometer count (steps/week)	Baseline	23491 (18549)	24144 (19946)	0.462†
	4	23877 (18591)	24613 (20522)	
	12	23638 (18442)	28002 (22387)	

Les patients ne font pas plus d'activité !

L'O_2 augmente t-elle les activités à la maison ?

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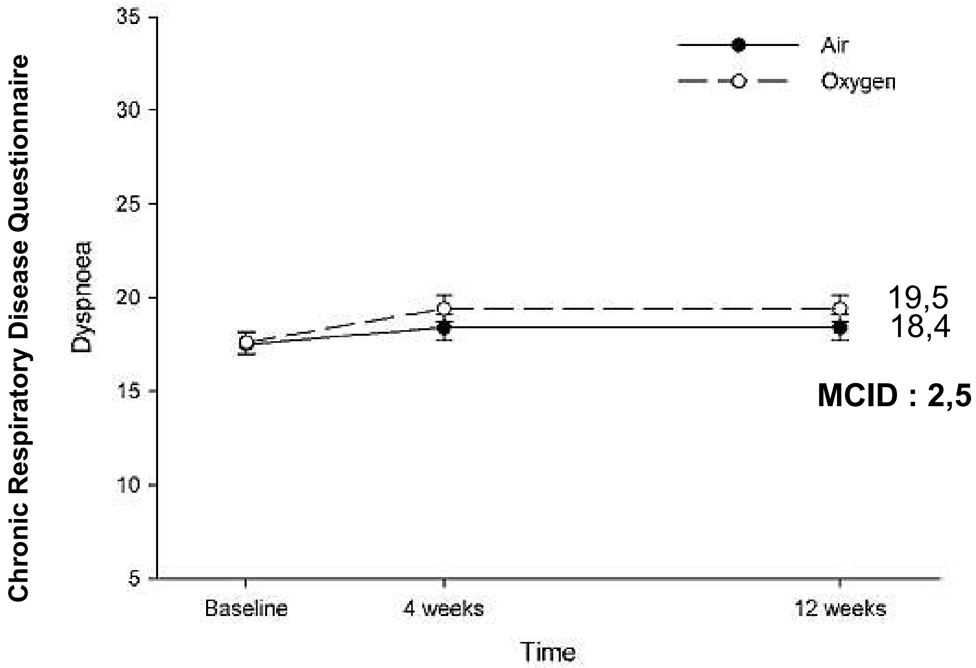

Figure 2 Effect of treatment on dyspnoea.

En résumé

Adjuvant = charge de travail ↗

Haute intensité et activité du patient post réhabilitation

Are Patients With COPD More Active After Pulmonary Rehabilitation?*

Fábio Pitta, PhD; Thierry Troosters, PhD; Vanessa S. Probst, PhD; Daniel Langer, MSc; Marc Decramer, PhD; and Rik Gosselink, PhD

29 patients BPCO
VEMS 46%
Réentraînement à 66% PMA

CHEST

Qu’attend le patient d’un programme de réhabilitation ?

Are Patients With COPD More Active After Pulmonary Rehabilitation?*

Fábio Pitta, PhD; Thierry Troosters, PhD; Vanessa S. Probst, PhD; Daniel Langer, MSc; Marc Decramer, PhD; and Rik Gosselink, PhD

6 mois RR ambulatoire
3 mois => 3 fois par semaine
3 mois => 2 fois par semaine

+ 13% à 6 mois de temps de marche

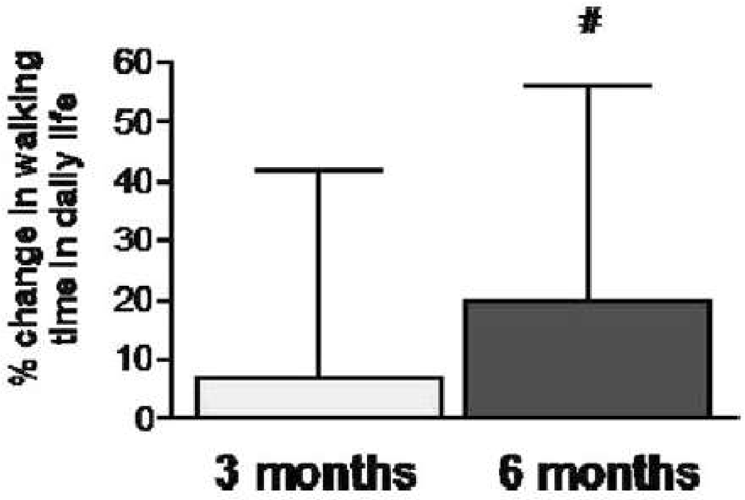

FIGURE 1. Average improvement in walking time in daily life in 29 COPD patients after 3 months (7%) and after 6 months (20%) of pulmonary rehabilitation (in % change compared to baseline values). The results are shown as the mean and SD. # = p = 0.10 vs changes after 3 months. In comparison to baseline values, walking time in daily life did not improve significantly after 3 months (p = 0.21), but only after 6 months (p = 0.008).

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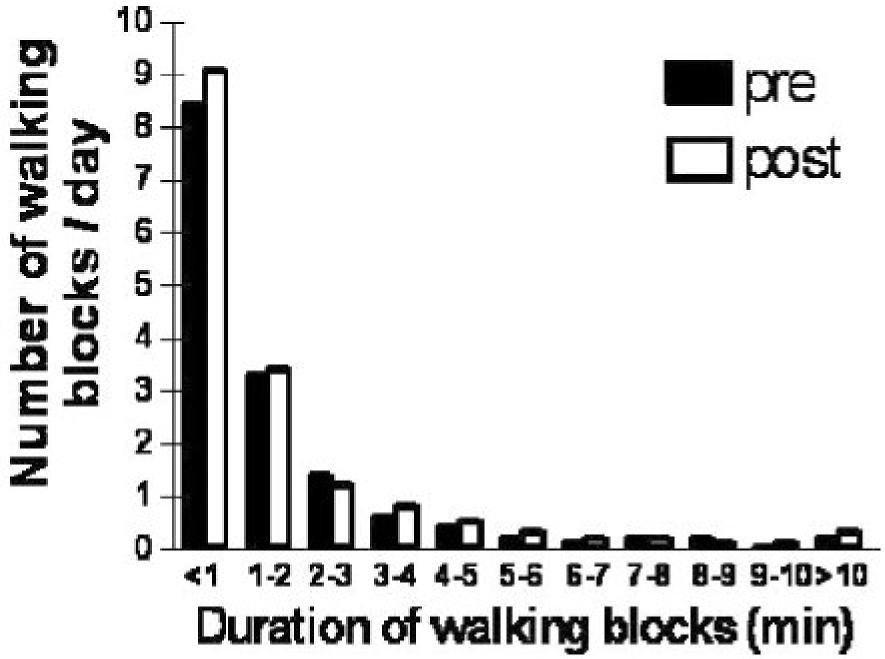
Qu'attend le patient d'un programme de réhabilitation ?



La haute intensité n'apporte probablement pas plus de bénéfice qu'un réentraînement d'intensité moindre sur les activités du patient en post réhabilitation

CHEST

En conclusion

La réhabilitation est efficace

Le temps est la clé

Favoriser les accès à la réhabilitation

⇒ intérêt du libéral

VNI/O_2 Difficile à mettre en place en libéral et chronophage ++

Pour maintenir une activité physique à la maison
=> éviter la surmédicalisation de l'effort physique

En conclusion

Pourquoi apporter un traitement médical supplémentaire à un patient si celui-ci ne lui apporte pas de bénéfice à long terme ?

Merci pour votre attention