EXERCICI FÍSIC:
Beneficis al Malalt Respiratori Crònic

Marian Ramon
Institut de Recerca - Hospital Universitari Vall d'Hebron

- Capacitat d'exercici i Malaltia Respiratòria Crònica.
- Beneficis del programes estructurats d'exercici físic.
- Tipus d'exercici a prescriure.

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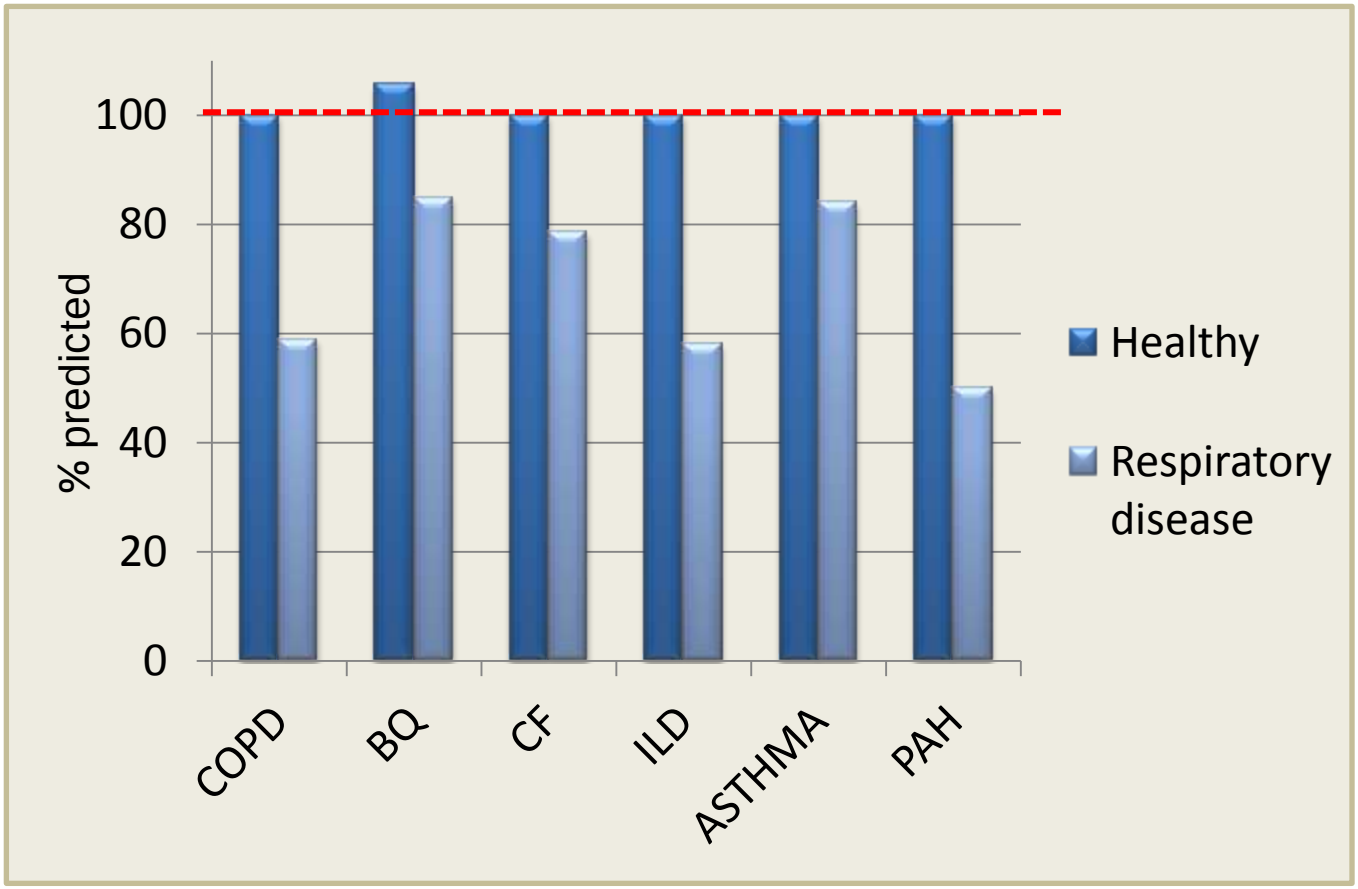
CAPACITAT D'EXERCICI AL MALALT RESPIRATORI CRÒNIC



Gosselink R, et al. Am J Res Crit Care Med 1996.

Ozalp, et al. Multidiscip Respir Med 2012.

Sovtic AD, et al. Respi Care 2013.

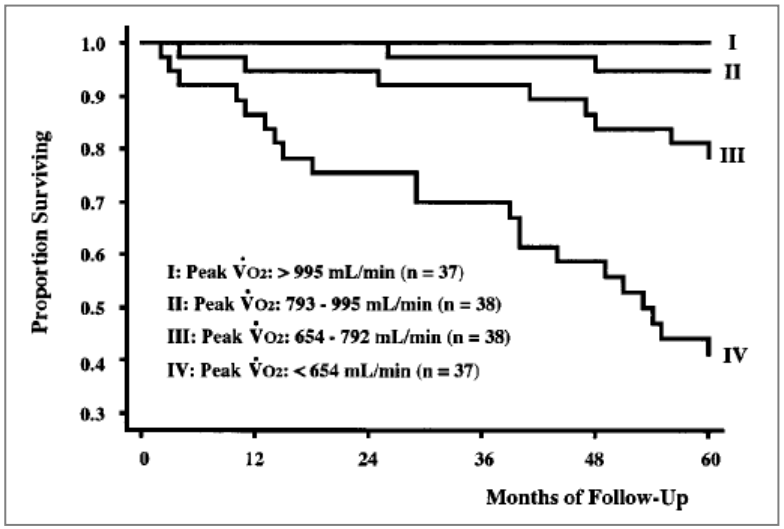
HollandAE, et al Thorax 2008.

Clark CJ, et al.Thorax 1988.

Miyamoto S, et al. Am J Res Crit Care Med 2000.

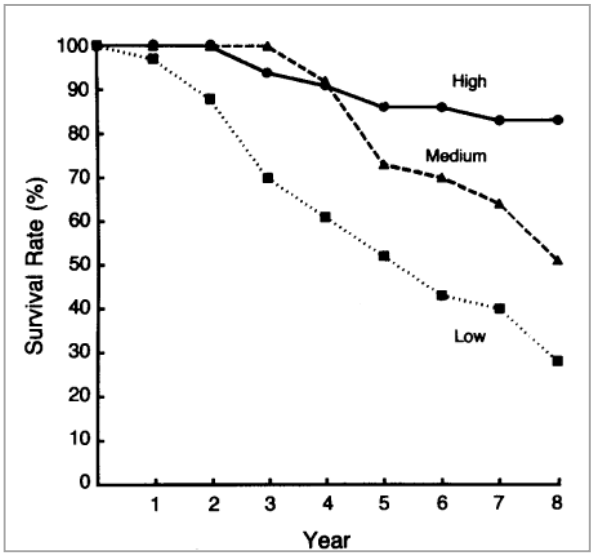
VALOR PRONÒSTIC DE LA CAPACITAT D'EXERCICI

MPOC



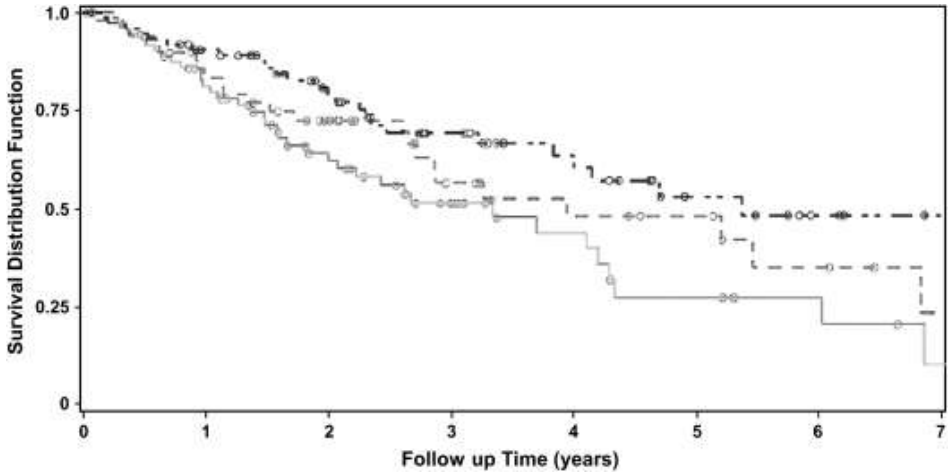
Oga T, et al. Am J Respir Crit Care Med, 2003.

FQ



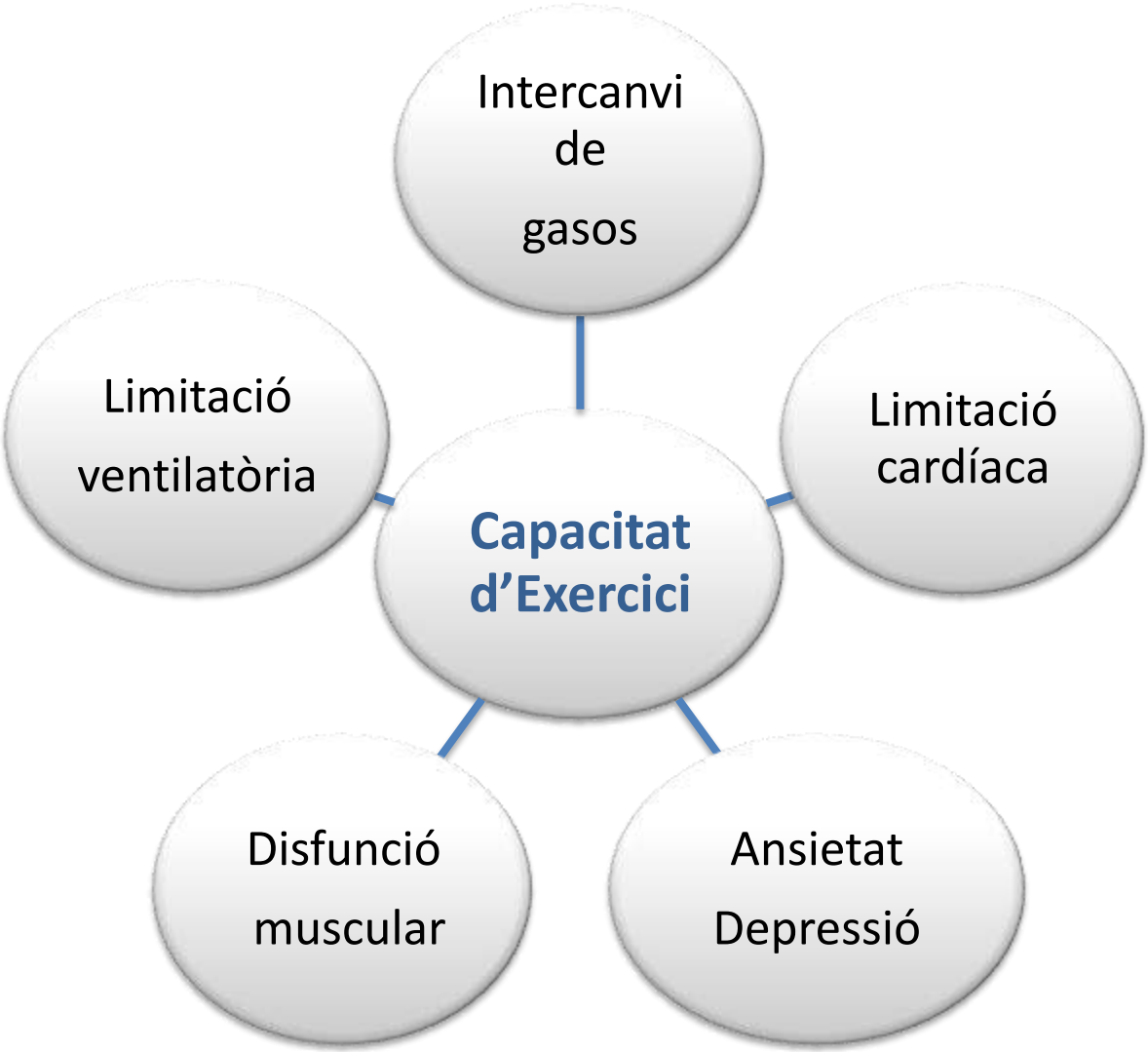
Nixon P, et al. NEJM, 1992.

FPI



Flaherty KM, et al. Am J Res Crit Care Med, 2006.

DETERMINANTS DE LA CAPACITAT D'EXERCICI



PÈRDUA LONGITUDINAL DE CE

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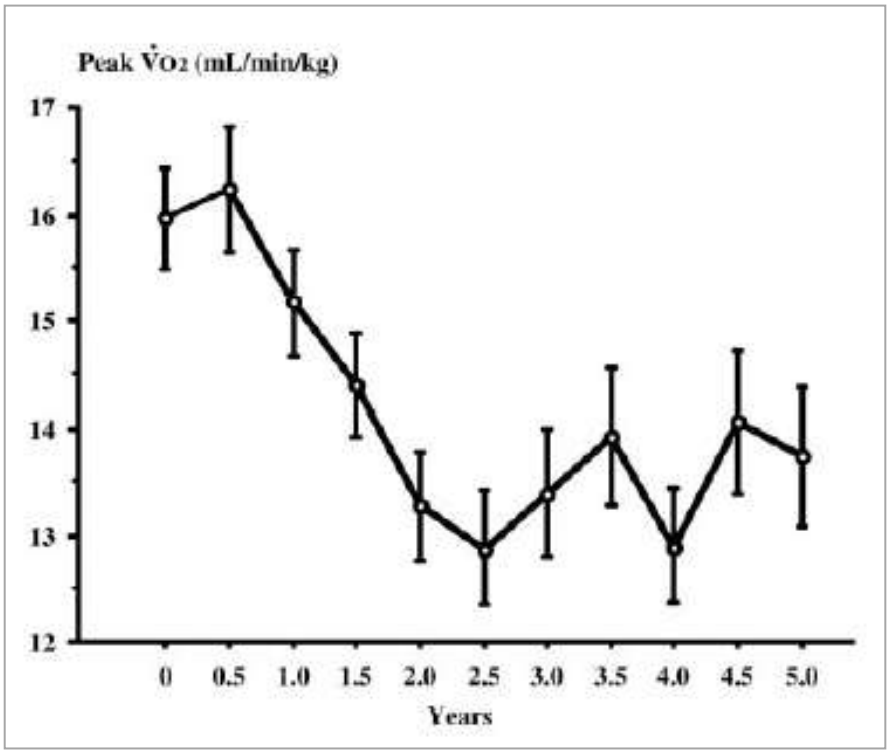

Oga T, el at. Chest 2005;128:62-69

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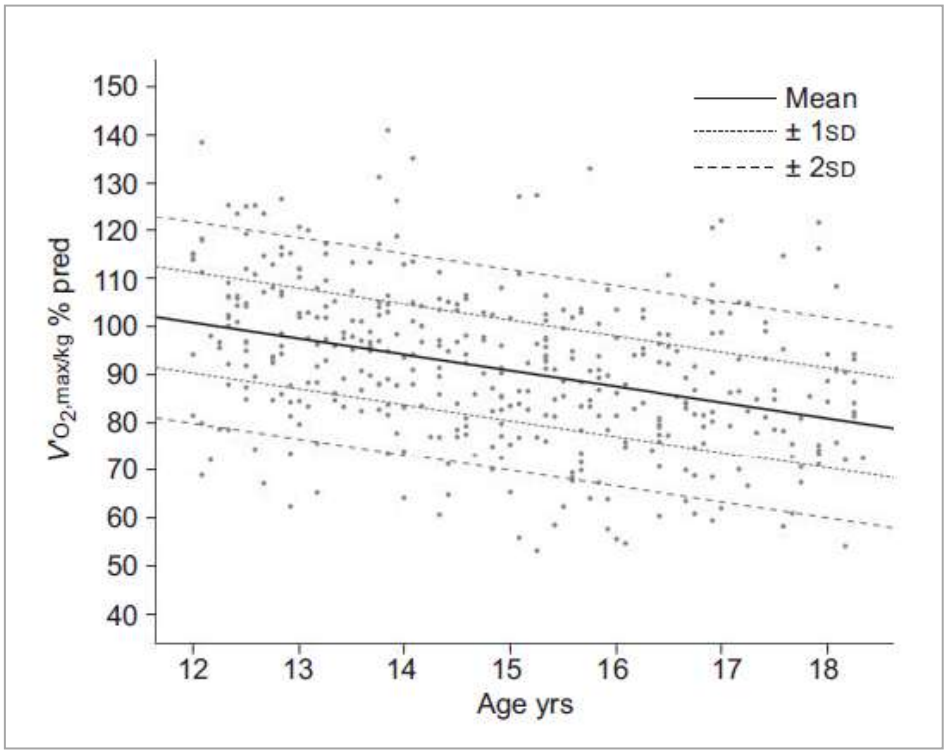


Van de Weert, et al. Eur Respir J 2012.

Hospital admissions and exercise capacity decline in patients with COPD

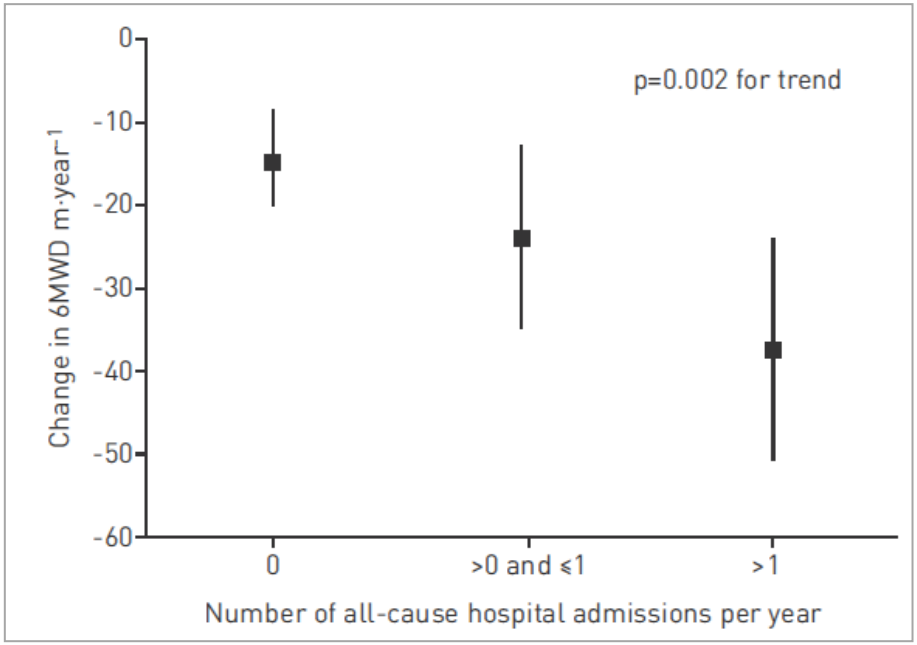
Maria A. Ramon, Elena Gimeno-Santos, Jaume Ferrer, Eva Balcells, Esther Rodríguez, Jordi de Batlle, Federico P. Gómez, Jaume Sauleda, Antoni Ferrer, Joan A. Barberà, Alvar Agustí, Joaquim Gea, Robert Rodriguez-Roisin, Josep M. Antó, Judith Garcia-Aymerich and the PAC-COPD Study Group

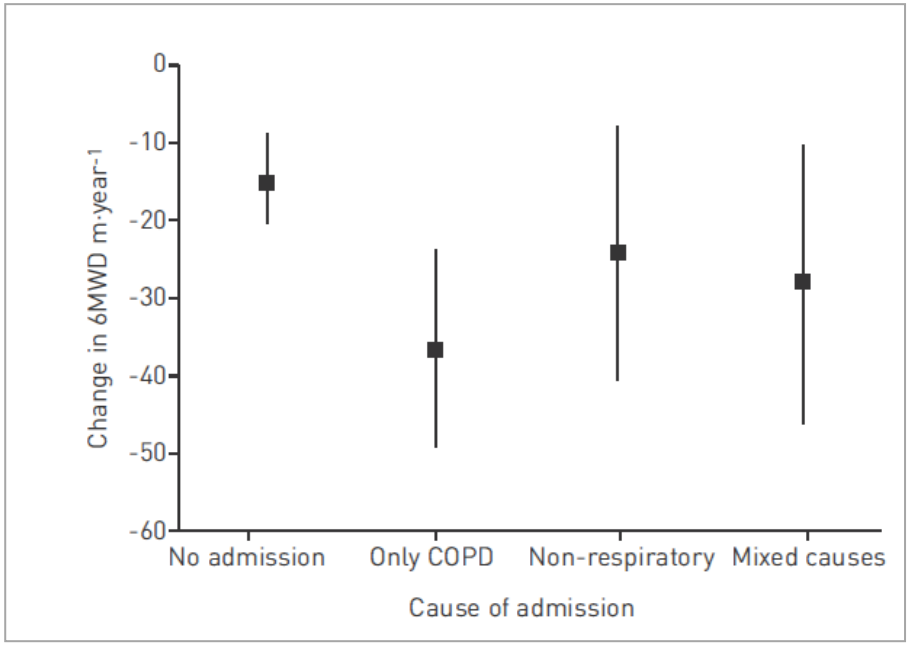
1ª Evaluación (momento basal)

342 pacientes de la cohorte PAC-EPOC

Ingresos Hospitalarios

2ª Evaluación 18-24 meses (seguimiento)





Ramon MA, et al. Eur Respi J 2014.

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Maria A. Ramon, Elena Gimeno-Santos, Jaume Ferrer, Eva Balcells, Esther Rodríguez, Jordi de Batlle, Federico P. Gómez, Jaume Sauleda, Antoni Ferrer, Joan A. Barberà, Alvar Agustí, Joaquim Gea, Robert Rodriguez-Roisin, Josep M. Antó, Judith Garcia-Aymerich and the PAC-COPD Study Group

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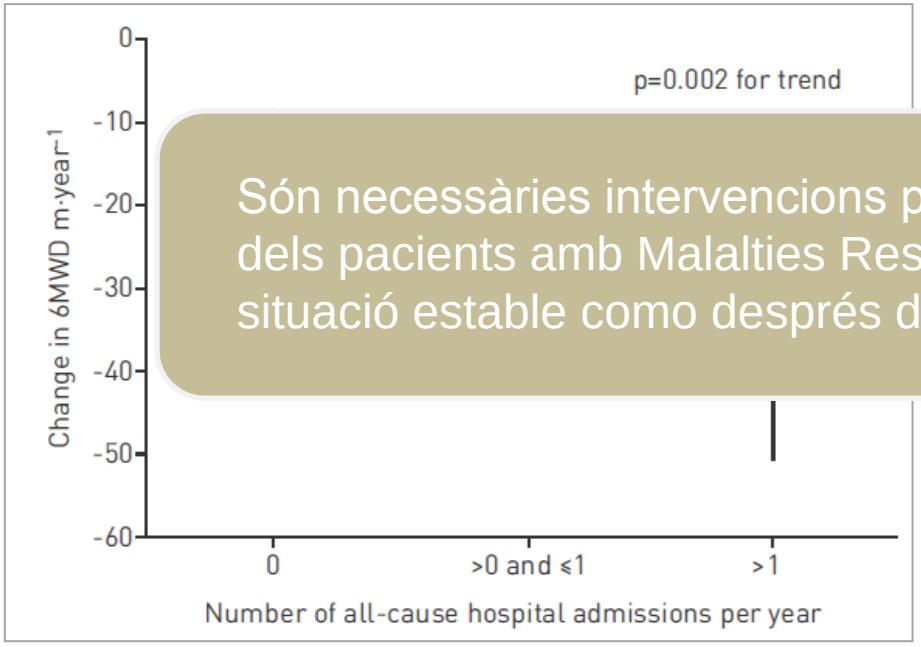

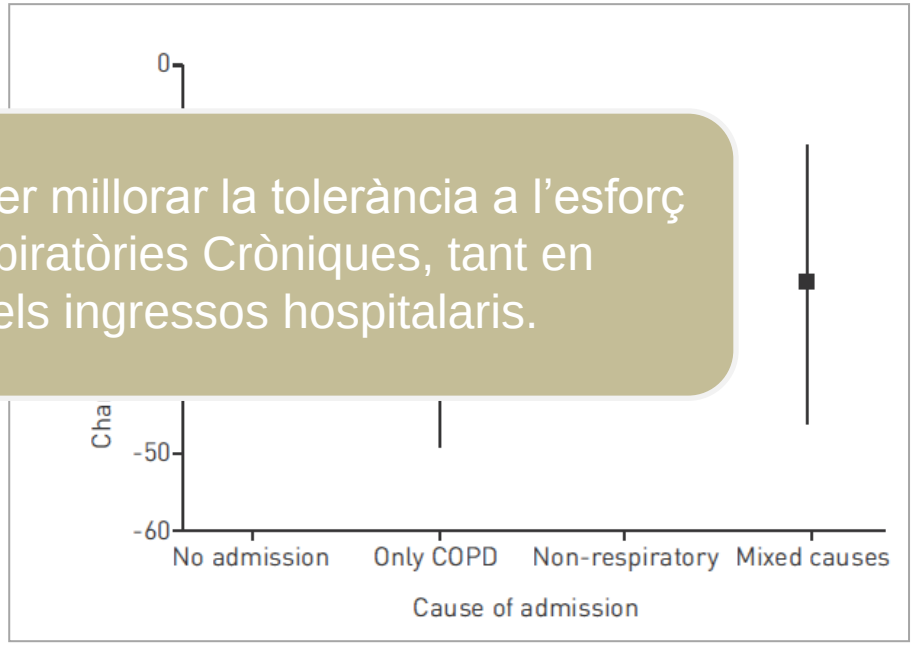

Són necessàries intervencions per millorar la tolerància a l'esforç dels pacients amb Malalties Respiratòries Cròniques, tant en situació estable como després dels ingressos hospitalaris.

Ramon MA, et al. Eur Respi J 2014.

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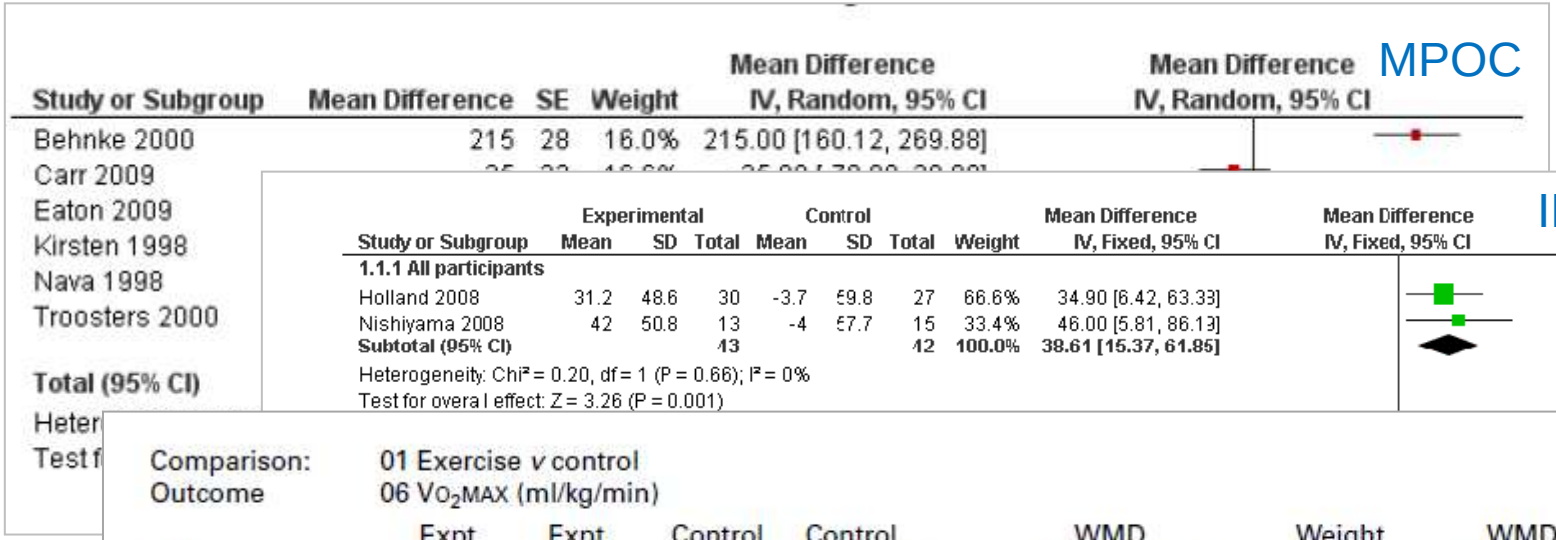
BENEFICIS DE L'ENTRENAMENT A PACIENTS AMB MRC

- ↑ Tolerància a l'esforç
- ↑ Força muscular
- ↓ Símptomes
- ↑ Qualitat de vida
- ↑ Drenatge de secrecions
- ↓ La pèrdua de funció pulmonar
- ↓ Ingressos Hospitalaris

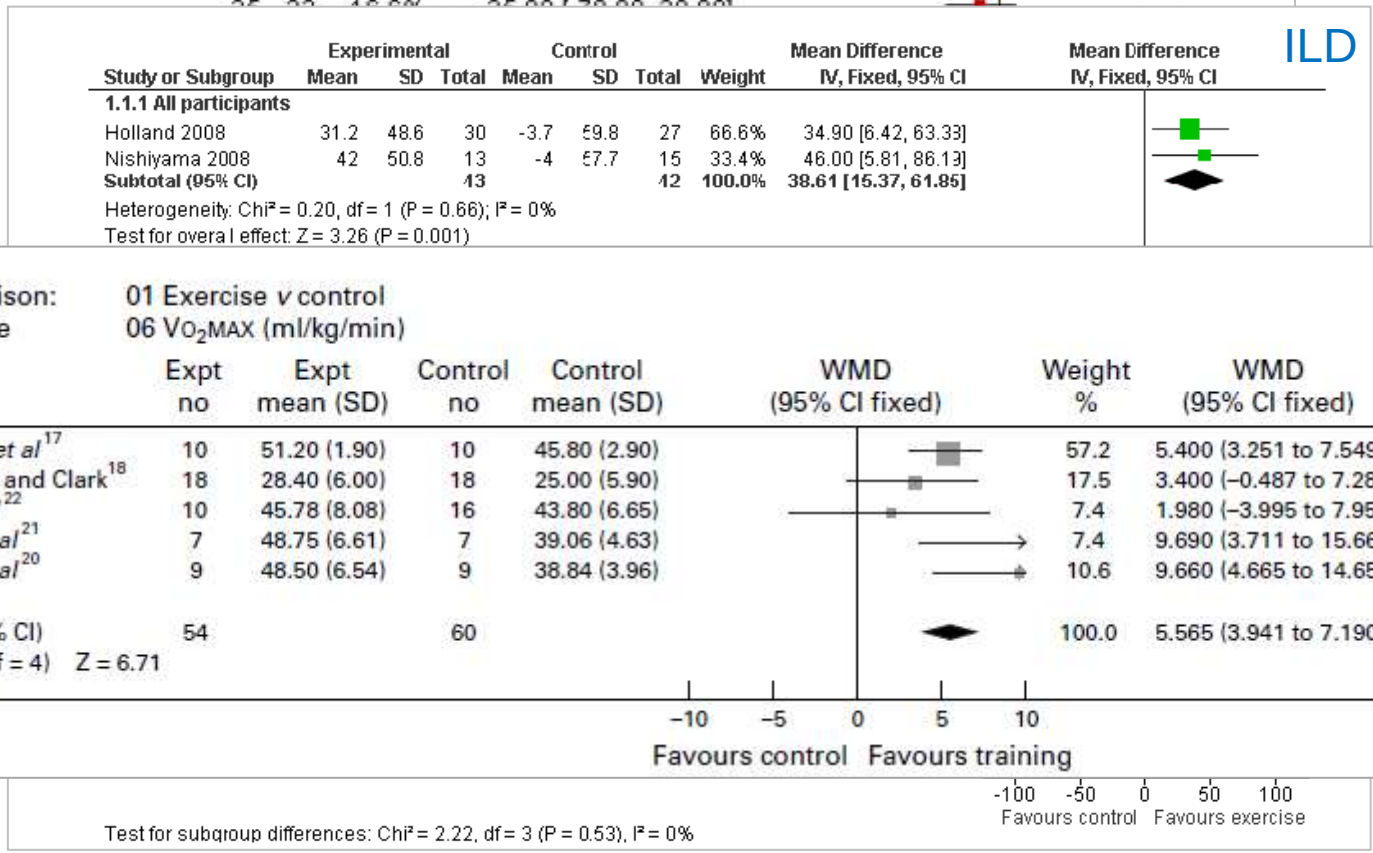
Spruit MA, et al. Am J Respir Crit Care Med 2013.

Tolerància a l'esforç

MPOC



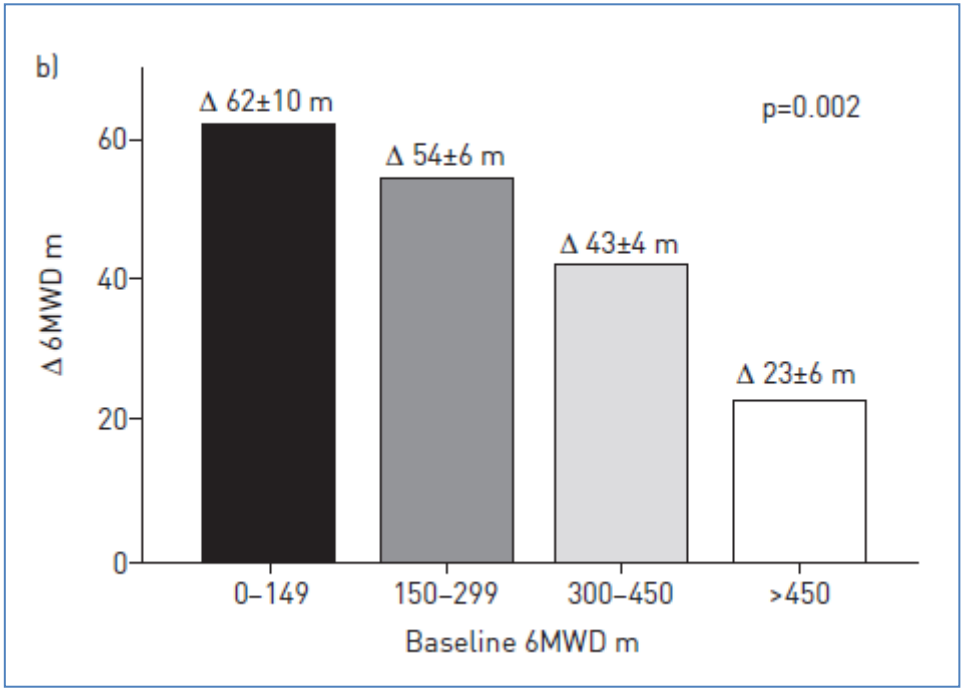
ILD



ASMA

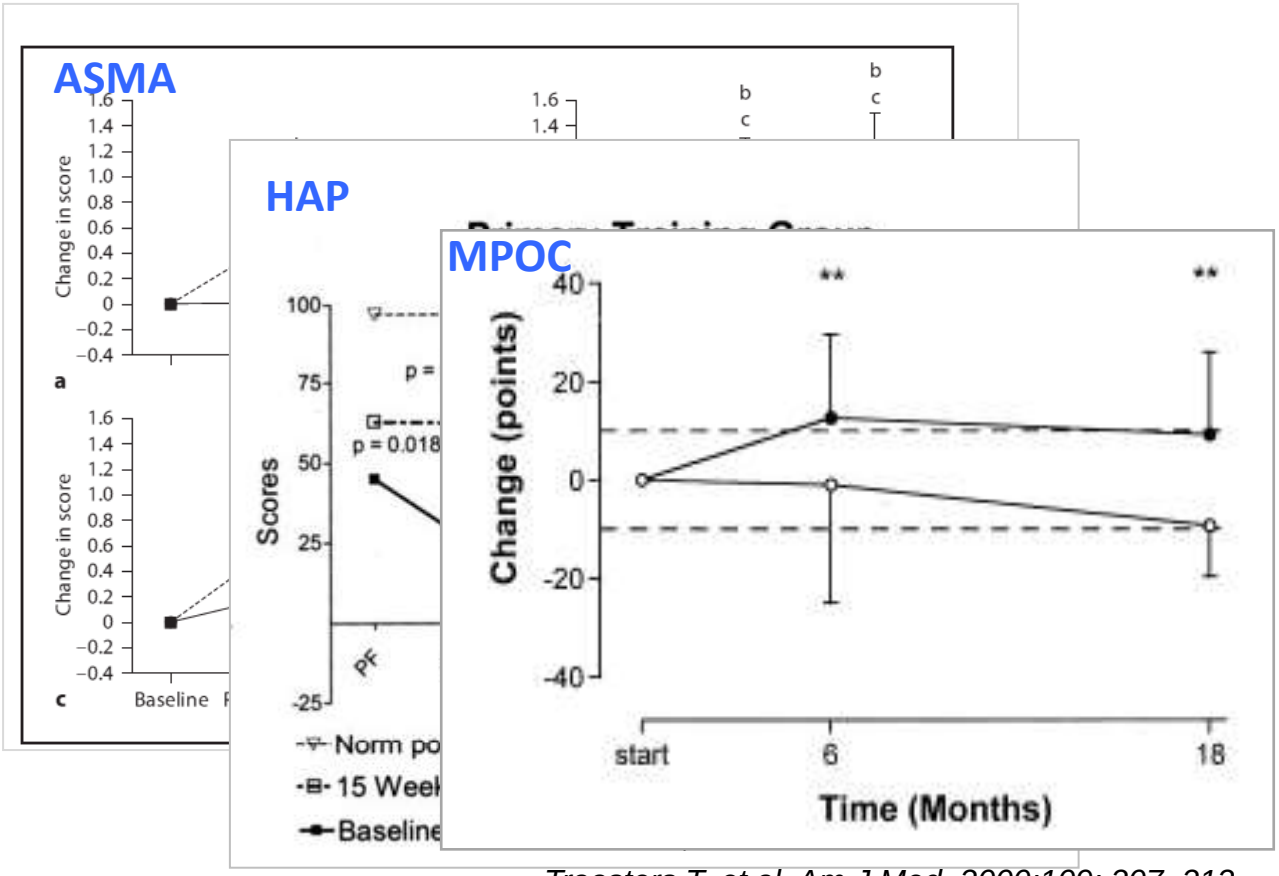
Tolerància a l'esforç

Millors resultats a pitjor esta funcional basal.



Huppmann p, et al. Eur Respir J 2013; 42: 444–453.

Qualitat de vida



Troosters T, et al. Am J Med. 2000;109: 207–212.

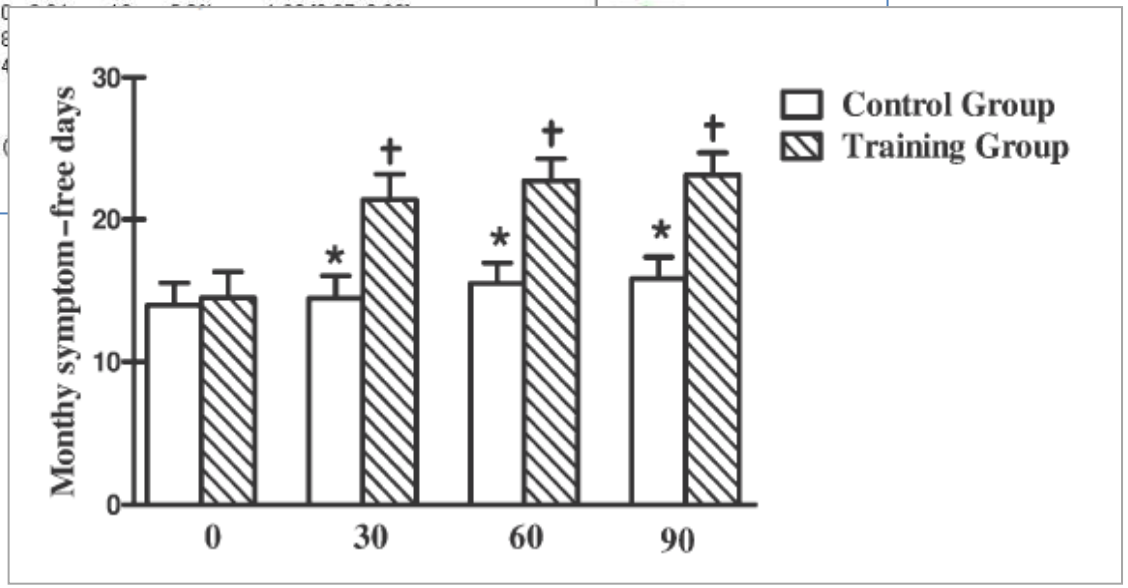
- Dispnea
- Factors Psicosocials: Ansietat, Depressió.

(Dyspnea).

Study or Subgroup	Rehab Mean	Rehab SD	Rehab Total	Usual care Mean	Usual care SD	Usual care Total	Weight	Mean Difference IV, Random, 95% CI
Behnke 2000a	2.42	1.24	15	0.16	1.32	15	4.6%	2.26 [1.34, 3.18]
Cambach 1997	1.2	1.2	14	0	0.8	8	5.5%	1.20 [0.36, 2.04]
Goldstein 1994	0.68	1.14	40	0.02	1.3	39	11.8%	0.66 [0.12, 1.20]
Gosselink 2000	0.8	1.28	34	-0.02	1.32	28	8.6%	0.82 [0.17, 1.47]
Griffiths 2000	1	1.28	93	-0.18	1	91	24.3%	1.18 [0.85, 1.51]
Güell 1995	1.2	1.4	29	-0.1	1.1	27	8.5%	1.30 [0.64, 1.96]
Güell 1998	0.8	1.2	18	-0.2	1.2	17	6.0%	1.00 [0.20, 1.80]
Hernandez 2000	1.08	1.14	20	0.3	1.2	17	6.6%	0.78 [0.02, 1.54]
Simpson 1992	1.2	1.14	12					
Singh 2003	0.96	0.88	20	0.08				
Wijkstra 1994	0.86	1.02	28	-0.04				
Total (95% CI)			323					

Heterogeneity: Tau² = 0.02; Chi² = 11.60, df = 10 (
Test for overall effect: Z = 10.13 (P < 0.00001)

Mean Difference IV, Random, 95% CI



Mendes et al, Chest 2010.

CHEST Original Research
ASTHMA

Effects of Aerobic Training on Psychosocial Morbidity and Symptoms in Patients With Asthma

A Randomized Clinical Trial

Ansietat

Depressió

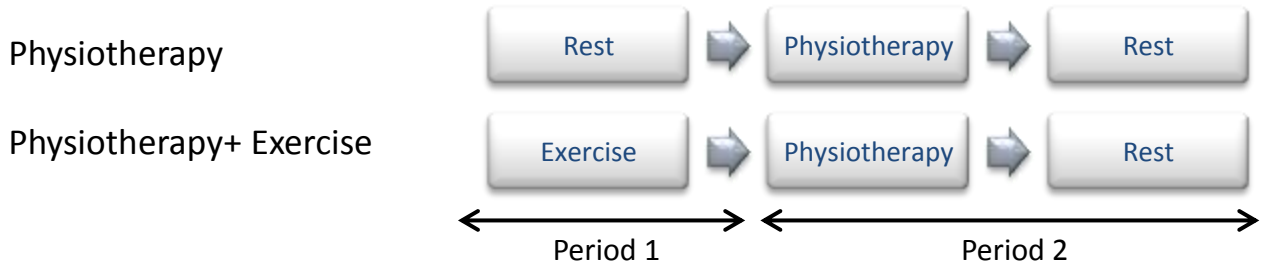
Table 3—*Proportion of Anxiety and Depression Levels of Adult Patients With Asthma Before and After the Treatment Program*

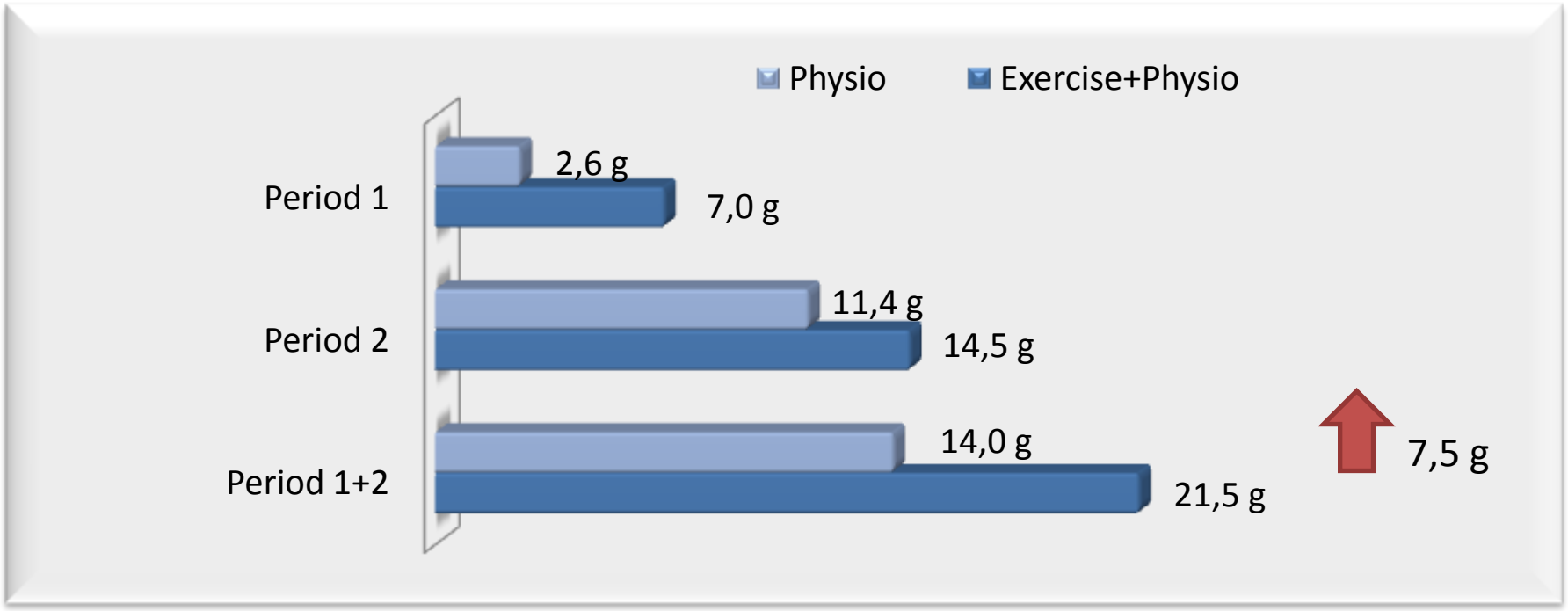
Anxiety and Depression Levels	Control Group (n = 45)		Training Group (n = 40)		*P* Value
	Before	After	Before	After	
STAI score					
State score					
Mild to moderate (< 50)	36 (80)	39 (87)	28 (64)	42 (95)[a]	< .001
Severe (≥ 50)	9 (20)	6 (13)	16 (36)	2 (5)[a]	< .001
Trait score					
Mild to moderate (< 50)	31 (69)	37 (82)	39 (89)	39 (89)	> .05
Severe (≥ 50)	14 (31)	8 (18)	5 (11)	5 (11)	> .05
BDI score					
Absent (< 10)	14 (31)	25 (56)	12 (27)	32 (73)[a]	< .001
Mild to moderate (10 to 18)	21 (47)	14 (31)	22 (50)	5 (11)[a]	< .001
Moderate to severe (> 18)	10 (22)	6 (13)	10 (23)	7 (16)[a]	< .001

Data are presented as No. (%). BDI = Beck Depression Inventory; STAI = State-Trait Anxiety Inventory.
[a]*P* < .05 compared with the intragroup value obtained at baseline; McNemar test.

Mendes et al, Chest 2010.

Drenatge de secrecions



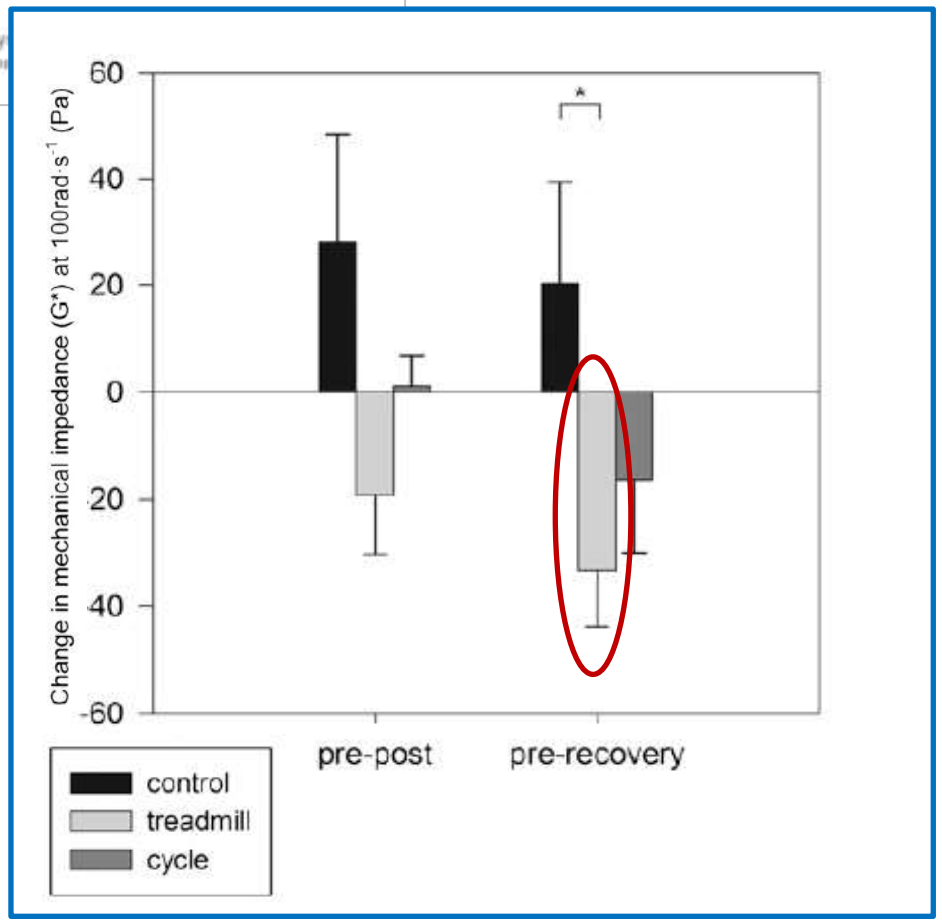


Baldwin DR, et al. Respir Med 1994.

CHEST Original Research
CYSTIC FIBROSIS

Effects of Exercise on Respiratory Flow and Sputum Properties in Patients With Cystic Fibrosis

Tiffany J. Dwyer, PhD; Jennifer A. Alison, Dip Phy[illegible]; Zoe J. McKeough, PhD; Evangelia Davidsas, MBio[illegible]; and Peter T. P. Bye, MBBS, PhD, FCCP



Dwyer TJ, et al. Chest 2011;139(4):870-877.

La pèrdua de funció pulmonar

Table IV. Annual rates of change of physical, exercise, and pulmonary function parameters

Variable	Exercise group (n = 30)	Control group (n = 35)	*P* value
Percent of ideal weight for height	0.48 ± 2.52	−0.04 ± 2.75	.43
FVC (% pred)	−0.25 ± 2.81	−2.42 ± 4.15	.02
FEV_1 (% pred)	−1.46 ± 3.55	−3.47 ± 4.93	.07
FEF_{25-75} (% pred)			
Max HR (beats/min)			
Max $\dot{V}_E$ (L/min)			
$\dot{V}O_{2max}$ (mL/kg/min)			
$\dot{V}_{Emax}$/MVV (%/min)			
W_{max} (% pred)			

Values are mean ± SD.
% pred, Percent predicted (height and
reserve.

Schneiderman-Walker et

TABLE 2—Effect of Training Programs at Time of Discharge and One Month After Discharge From Hospital[1]

		Aerobic training		Resistance training		Controls	
		At discharge	1 month later	At discharge	1 month later	At discharge	1 month later
Δ FEV_1 (% predicted)	(X̄)	6.54*	6.25*	10.09**	9.80**	4.51*	4.72*
	(SD)	(7.76)	(7.94)	(7.43)	(7.81)	(6.90)	(7.15)
Δ FVC (% predicted)	(X̄)	2.34	2.20	2.45	2.37	2.28	2.31
	(SD)	(4.62)	(4.27)	(4.18)	(4.09)	(4.22)	(4.29)
Δ $V'O_2$ (mL/kg/min)	(X̄)	7.31**	7.56**	0.73	2.25	−1.22	2.65
	(SD)	(6.29)	(6.75)	(5.89)	(6.25)	(6.15)	(6.02)
Δ quality of life score			0.09**		0.02		−0.01
			(0.12)		(0.10)		(0.12)
Δ body mass (kg)	(X̄)	0.80*	1.10*	2.76**	2.65**	1.03*	1.00*
	(SD)	(0.64)	(0.78)	(0.70)	(0.73)	(0.58)	(0.66)
Δ fat-free mass (kg)	(X̄)	0.61*	0.69*	2.40**	2.36**	0.60*	0.65*
	(SD)	(0.37)	(0.41)	(0.46)	(0.47)	(0.32)	(0.36)
Δ strength (Nm)	(X̄)	1.83	1.90	18.32**	15.00**	−6.30	−4.23
	(SD)	(6.23)	(6.12)	(7.02)	(7.21)	(6.10)	(6.25)

[1]All values shown are mean and standard deviation from the mean values. Significant differences from values on admission are indicated.
*$-P < 0.05$, Student's *t*-test.
**$P < 0.01$, Student's *t*-test.

Selvadurai, et al. Pediatric Pulmonology 2002

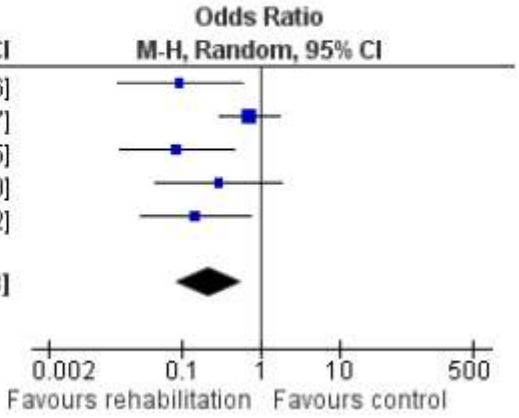
Ingressos Hospitalaris

Figure 2. Forest plot of comparison: 1 Rehabilitation versus control, outcome: 1.1 Hospital admission (to end of follow-up).

Study or Subgroup	Experimental Events	Experimental Total	Control Events	Control Total	Weight	Odds Ratio M-H, Random, 95% CI
Behnke 2000	3	14	9	12	16.7%	0.09 [0.01, 0.56]
Eaton 2009	11	47	15	50	29.9%	0.71 [0.29, 1.77]
Man 2004	2	20	12	21	18.1%	0.08 [0.02, 0.45]
Murphy 2005	2	13	5	13	16.2%	0.29 [0.04, 1.90]
Seymour 2010	2	30	10	30	19.0%	0.14 [0.03, 0.72]
Total (95% CI)		**124**		**126**	**100.0%**	**0.22 [0.08, 0.58]**
Total events	20		51			

Heterogeneity: Tau² = 0.61; Chi² = 8.15, df = 4 (P = 0.09); I² = 51%

Test for overall effect: Z = 3.06 (P = 0.002)



Puhan MA, et al. The Cochrane Library 2011.

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VARIABLES DE L'ENTRENAMENT

1. Intensitat
2. Freqüència
3. Durada de Sessions
4. Modalitat d'entrenament

Spruit MA, et al. Am J Respir Crit Care Med 2013;188(8):e13-64.

VARIABLES DE L'ENTRENAMENT

1. INTENSITAT

Alta intensitat !

- > 60% W_{max}
- > 70% FC_{max}
- Borg dispnea 4-6 (moderada a greu)

És imprescindible ajustar la intensitat a mesura que millora la tolerància a l'esforç.

Spruit MA, et al. Am J Respir Crit Care Med 2013;188(8):e13-64.

VARIABLES DE L'ENTRENAMENT

2-3. FREQÜÈNCIA i DURACIÓ

- 8 - 12 setmanes
- 2 - 5 dies per setmana
- 30 - 60 min per sessió
- 2 primeres setmanes d'adaptació
- Necessitat de manteniment post-entrenament

Spruit MA, et al. Am J Respir Crit Care Med 2013;188(8):e13-64.

VARIABLES DE L'ENTRENAMENT

4. MODALITAT D'ENTRENAMENT

six minute walking distance

movement intensity

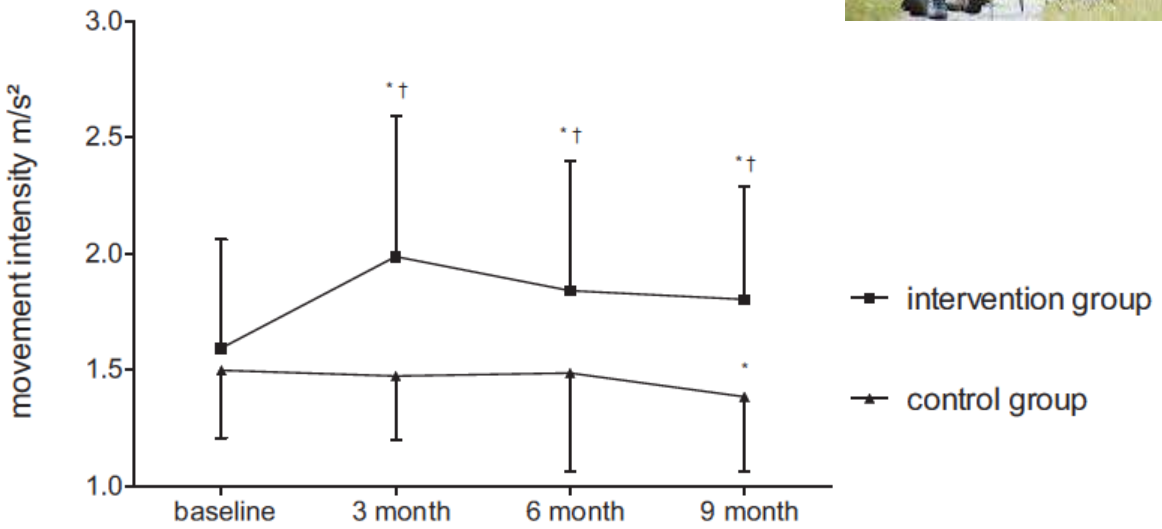
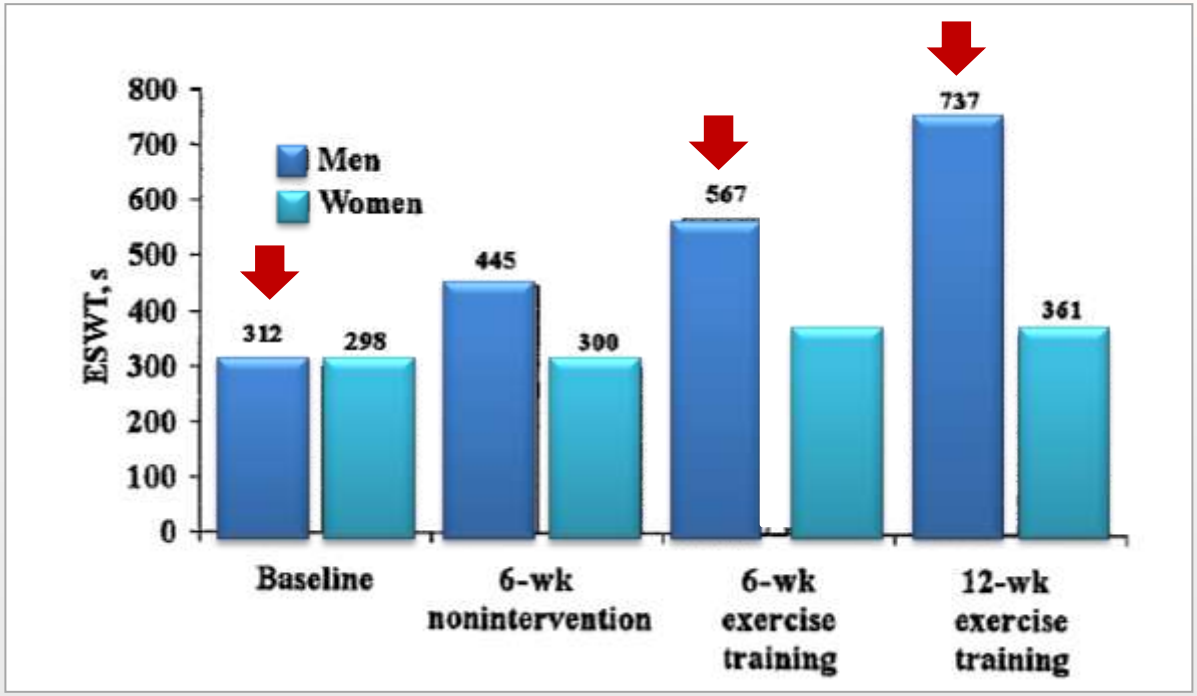


Figure 2 Movement intensity of COPD patients of intervention and control group over time. Statistical comparisons within groups: * $p < 0.01$ compared to baseline. Statistical comparison between groups (intervention vs. control): † $p < 0.01$ at all times. (Whiskers represent SD).

Breyer MK. et al Respir Research 2010.

VARIABLES DE L'ENTRENAMENT

4. MODALITAT D'ENTRENAMENT



Albores J, et al. J Cardiopulm Rehabil Prev 2013.

VARIABLES DE L'ENTRENAMENT

4. MODALITAT D'ENTRENAMENT

TABLE 2 Exercise capacity, bal

TABLE 3 Health related quality of life, anxiety and depression and self-efficacy

	Group				Difference within group#		Difference between groups#
	Week 0		Week 12		TCG	CG	
	TCG	CG	TCG	CG			
Chronic Respiratory Disease questionnaire							
Dyspnoea	3.6±1	3.8±1	4.4±1	3.7±1	0.8±0.8	-0.04±0.5	0.9 (0.5–1.3)
Fatigue	4.8±1	4.3±1	5.3±1	4.2±1	0.6±0.8	0.03±0.5	0.5 (0.1–1.0)
Emotional function	5.6±1	5.0±2	6.0±1	5.0±2	0.3±0.7	-0.04±0.4	0.4 (0.02–0.8)
Mastery	5.6±1	5.2±1	6.0±1	5.1±1	0.4±0.8	-0.1±0.5	0.5 (0.1–0.9)
Total	5.9±5	4.6±1	6.5±5	4.6±1	0.6±0.7	-0.1±0.4	0.7 (0.3–1.0)
Hospital Anxiety and Depression scale							
Anxiety	4±3	5±4	3±3	6±6	-1±2	0.6±2	-2 (-2– -0.5)
Depression	4±3	3±2	3±3	4±4	-0.3±1	1±3	-2 (-3–0.02)
FPI total	2.4±0.5	2.5±0.4	2.5±0.5	2.5±0.5	0.2±0.2	-0.1±0.2	0.2 (0.1–0.4)

Leung RW, et al. Eur Respi J 2013.

CONCLUSIONS

- La tolerància a l'esforç es veu reduïda en molts malalts amb patologia respiratòria crònica.
- La intolerància a l'exercici s'associa amb pobres resultats de salut.
- Els programes d'exercici físic tenen la capacitat de millorar la tolerància a l'esforç, la qualitat de vida i disminuir els símptomes d'aquests malalts, entre altres aspectes.
- L'exercici físic d'alta intensitat, realitzat durant un mínim de 8 setmanes i amb una freqüència de 3 cops per setmana pot assolir aquests beneficis.
- L'oferta de modalitat d'entrenament és variada i pot afavorir l'adherència.

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