Pulmonary rehabilitation

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Conflit d'intérêt

- Kinésithérapeute hospitalier

Pulmonary rehabilitation

Pulmonary rehabilitation is a comprehensive intervention based on a thorough patient assessment followed by patient-tailored therapies which include, but are not limited to, exercise training, education and behavior change, designed to improve the physical and emotional condition of people with chronic respiratory disease and to promote the long-term adherence to health-enhancing behaviors.

ERS EUROPEAN RESPIRATORY SOCIETY every breath counts

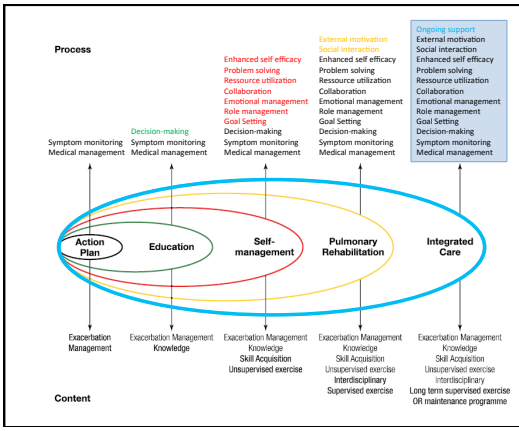
ATS We help the world breathe

ATS We help the world breathe

ERS EUROPEAN RESPIRATORY SOCIETY every breath counts

PR teams are interdisciplinary rather than multidisciplinary

Nici et al. AJRCCM 2006



Pulmonary rehabilitation

En milieu hospitalier

- Interdisciplinaire
- Vision globale (éducation, exercice, parole…)
- Progression ou maintien

En exacerbation

- Interdisciplinaire
- Vision globale (éducation, exercice, parole…)
- Récupération

POURQUOI?

Limitations à l'effort

- Ventilatoire
- Dysfonction musculaire
- Echanges gazeux
- Cardiaque

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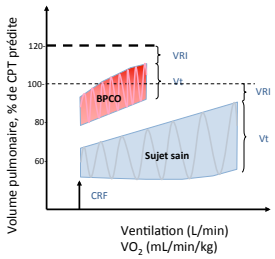

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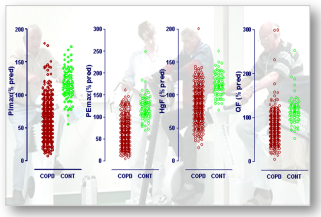

Courtesy of Th. Troosters

Limitations à l'effort

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Table I Quadriceps and diaphragm structure and function in patients with COPD compared with controls

	Quadriceps	Diaphragm
Strength	Reduced	Unchanged
Endurance	Reduced	Increased
Overall CSA	Reduced	Unchanged
Single-fiber CSA	Reduced in type IIX	Reduced in type I
Fiber type shift	Type I to II	Type II to I
Capillary and mitochondrial density	Reduced	Increased
Metabolism – oxidative: glycolytic ratio	Reduced	Increased

Abbreviation: CSA, cross-sectional area.

Int J Chron Obstruct Pulmon Dis. 2012; 7: 523–535

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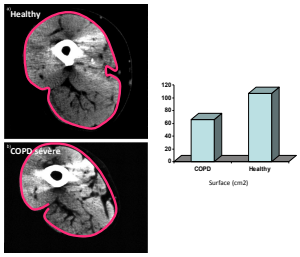
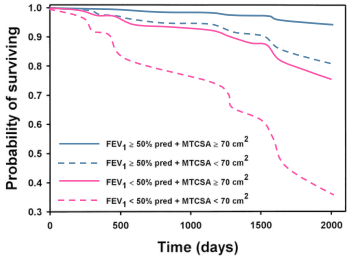


Allaire, thorax 2004

Muscles, fonction pulmonaire et survie



Marquis K et al. Am J Respir Crit Care Med 2002;166:809-813

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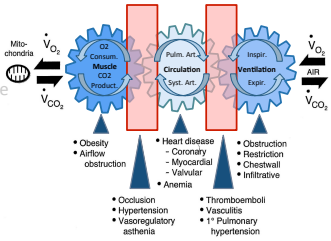


Copyright © American Heart Association

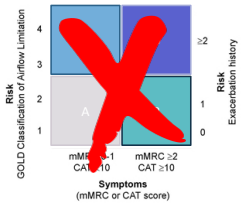
Milani R V et al. Circulation 2004;110:e27-e31

Pulmonary rehabilitation

POUR QUI?

Sélection optimale des patients

« Tout BPCO avec un traitement optimal et présentant des symptômes ou une limitation fonctionnelle »



Global Strategy for Diagnosis, Management and Prevention of COPD

Manage Stable COPD: Non-pharmacologic

Patient Group	Essential	Recommended	Depending on local guidelines
A	Smoking cessation (can include pharmacologic treatment)	Physical activity	Flu vaccination Pneumococcal vaccination
B, C, D	Smoking cessation (can include pharmacologic treatment) Pulmonary rehabilitation	Physical activity	Flu vaccination Pneumococcal vaccination

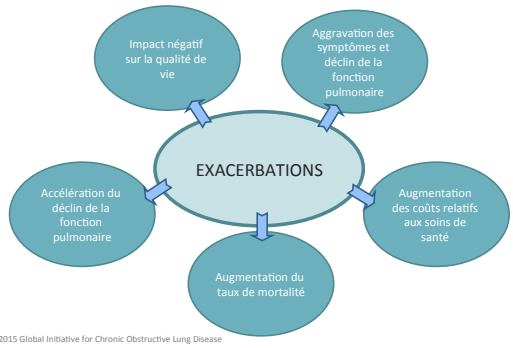
Global Strategy for Diagnosis, Management and Prevention of COPD

Manage Exacerbations: Key Points

An exacerbation of COPD is *"An acute event characterized by a worsening of the patient's respiratory symptoms that is beyond normal day-to-day variations and leads to a change in medication."*

"The goal of treatment is to minimize the impact of the current exacerbation and to prevent the development of subsequent exacerbations."

Conséquences des exacerbations



COMMENT?

Eur Respir Rev 2013; 22: 128, 178–186
DOI: 10.1183/09059180.00000513
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SERIES "THEMATIC REVIEW SERIES ON PULMONARY REHABILITATION"
Edited by M.A. Spruit and E.M. Clini
Number 1 in this Series

TABLE 2 Practical recommendations for the implementation of continuous and interval endurance training programmes

	Continuous endurance training	Interval endurance training
Frequency	3–4 days·week^{-1}	3–4 days·week^{-1}
Mode	Continuous	Interval modes: 30 s of exercise, 30 s of rest or 20 s of exercise, 40 s of rest
Intensity	Initially 60–70% of PWR Increase work load by 5–10% as tolerated Progressively try to reach ~80–90% of baseline PWR	Initially 80–100% of PWR for the first three to four sessions Increase work load by 5–10% as tolerated Progressively try to reach ~150% of baseline PWR
Duration	Initially 10–15 min for the first three to four sessions Progressively increase exercise duration to 30–40 min	Initially 15–20 min for the first three to four sessions Progressively increase exercise duration to 45–60 min (including resting time)
Perceived exertion	Try to aim for a perceived exertion on the 10-point Borg scale of 4 to 6	Try to aim for a perceived exertion on the 10-point Borg scale of 4 to 6
Breathing technique	Suggest pursed-lip breathing or the use of PEP devices to prevent dynamic hyperinflation and to reduce breathing frequency	Suggest pursed-lip breathing or the use of PEP devices to prevent dynamic hyperinflation and to reduce breathing frequency

PWR: peak work rate; PEP: positive expiratory pressure. Adapted from [30].

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TABLE 4 Practical recommendations for the implementation of strength training

Frequency	2–3 days·week^{-1}
Objective	Targeting for local muscular exhaustion within a given number of repetitions for major muscle groups of upper and lower extremities
Mode	Two to four sets of six to 12 repetitions
Intensity	50–85% of one repetitive maximum as a reference point Increase work load by 2–10% if one to two repetitions over the desired number are possible on two consecutive training sessions
Speed	Moderate (1–2 s concentric and 1–2 s eccentric)

Data from [53].

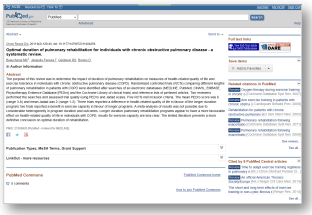
TABLE 5 Practical recommendations for the implementation of inspiratory muscle training (IMT)

Frequency	5–7 days·week^{-1}
Objective	To increase inspiratory muscle strength in patients with inspiratory muscle weakness (P_{Imax} <60 cmH_2O)
Mode	Most commonly threshold loading
Intensity	Initially ≥30% of P_{Imax} Increase load as tolerated
Duration	For example, using an interval approach with 7× 2 min of IMT and 1 min of rest between each interval

P_{Imax}: maximal inspiratory pressure. Data from [60, 62].

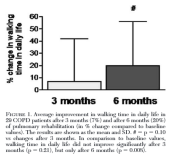
Programme

- Durée
  - Pas de consensus
  - Influencée par
    - Remboursement
    - Ressources
    - Progrès



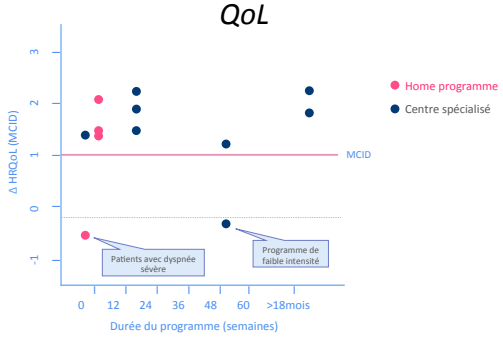
Programme

- Durée
  - Effet proportionnel à la durée
  - 2/3x/sem minimum
  - 1-4h par séance
  - Minimum 8 semaines
- Home vs hospital
  - Equivalent mais…
  - Fonction des besoins (supervision, transport)



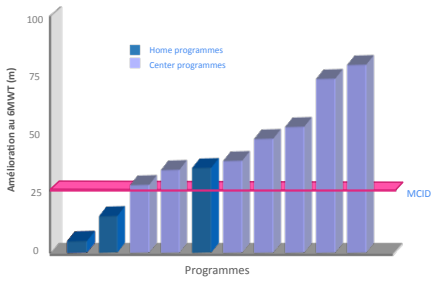
It takes 3 months to train the muscles and 6 months to train the brain!
Polkey ERJ 2009

Bénéfices
QoL



Troosters T et al. Am J Respir Crit Care Med 2005;172:19–38

Bénéfices
Tolérance à l'effort

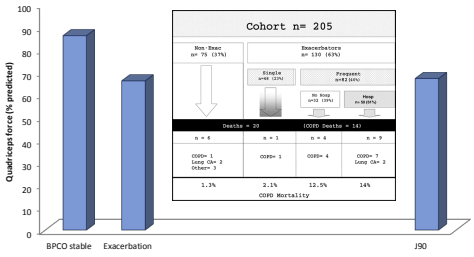


Troosters T et al. Am J Respir Crit Care Med 2005;172:19–38

ATS/ERS statement: "…pulmonary rehabilitation as 'an effective and safe intervention after an acute exacerbation for COPD" … "initiation of a program during or early after (3 weeks) the hospitalization period"

British Thoracic Society guideline: "patients hospitalized for acute exacerbation of COPD should be offered pulmonary rehabilitation at hospital discharge to commence within 1 month of discharge"

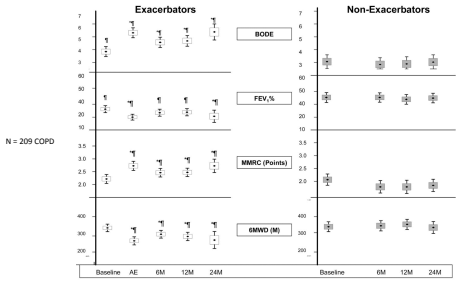
Rationnel : fonte musculaire



Cote, Chest. 2007;131(3):696-704

Spruit M, Thorax 2003;58:752-756

Rationnel : déclin



Right panel, non-exacerbators. Left panel, Exacerbators. (* = p<0.01 compared with baseline, ¶ = p<0.001 compared with non-exacerbators).

Chest. 2007;131(3):696-704

Table 2 Characteristics of rehabilitation programmes offered in the acute setting

	Onset	Setting	Exercise modality	Training intensity	Session length	Session frequency	Duration
Kirsten et al. 1998[37]	6–8 days following admission	Inpatient	Treadmill/walking	NR	<15 min	5/day	10 days
Nava et al. 1998[38]	3–5 days following admission	Inpatient	Mobilisation/resistance/ walking/cycling/ stair climbing	Borg RPE ≤6	30–45 min	2/day	3 weeks
Behnke et al. 2000[39]	4–7 days following	Inpatient	Treadmill/walking	NR	<15 min	5/day	10 days
							6 months
Troosters 2000[19]							6 months
Man et al. 2004[24]							8 weeks
Murphy et al. 2005[35]							6 weeks
Carr et al. 2006[28]							3 weeks
Eaton et al. 2009[29]							NR
							8 weeks
Seymour 2010[27]							8 weeks
Ko et al. 2							8 weeks
	admission		walking/cycling	oxygen uptake/max pred. HR		daily physical activity	
Greening et al. 2014[30]	<48 h of hospital admission	Inpatient	Resistance/walking/NMES	70% 1RM /modified Borg RPE < 13	30 min	Daily	
		Home (unsupervised)	Resistance/walking/NMES	70% 1RM/modified Borg RPE < 13		Resistance 3/week Walking/NMES daily	6 weeks

HR, heart rate; NMES, neuromuscular electrical stimulation; NR, not reported; pred., predicted; RM, repetition maximum; RPE, rating of perceived exertion.

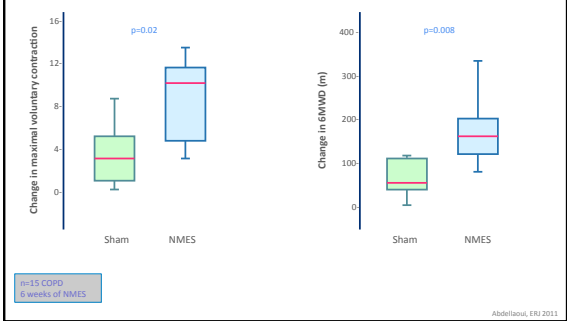
Respirology 20

REVIEW

Rehabilitation following hospitalization in patients with COPD: Can it reduce readmissions?

MATTHEW MADDOCKS,[1,2] SAMANTHA S.C. KON,[2,3] SALLY J. SINGH[4] AND WILLIAM D.-C. MAN[2,3]

ELECTROSTIMULATION



n=15 COPD
6 weeks of NMES

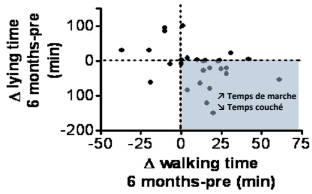
Abdellaoui, ERJ 2011

Pour conclure…

Are Patients With COPD More Active After Pulmonary Rehabilitation?*

Pitta F, Troosters T, Probst VS, Langer D, Decramer M, Gosselink R.

CHEST. 2008;134(2):273-280. doi:10.1378/chest.07-2655



Plot of changes (Δ) in walking time and lying time in daily life in 29 COPD patients after 6 months of pulmonary rehabilitation (r = 0.36; p = 0.06). The points included in the gray area correspond to patients who improved their walking time and decreased their lying time at the end of the rehabilitation program (19 of 23 patients; 83%).

Merci