SOCIÉTÉ CANADIENNE DE THORACOLOGIE

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Pulmonary Rehabilitation in Frailty People with Chronic Respiratory Diseases

Avril 2019

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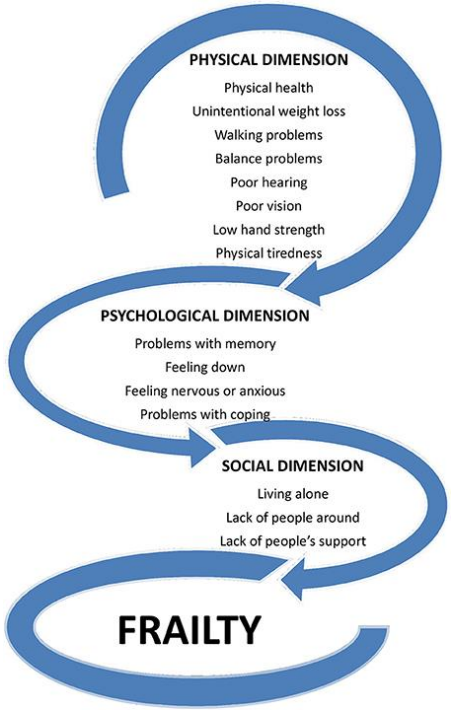

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Disclosure of Conflict of Interest (over the past 2 years)

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Physician Name Here

☒ I have no conflict of interest.

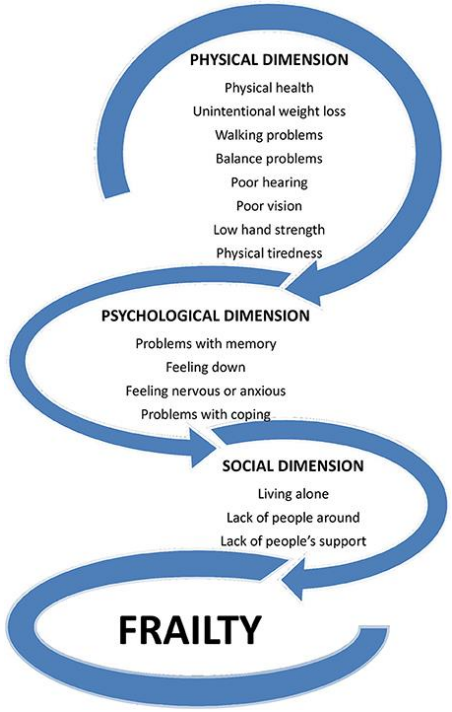
aims:

- Discuss rational for functional pulmonary rehabilitation in frail people with chronic respiratory diseases.
- Review concept and prevalence of frailty in people with chronic respiratory diseases.
- Describe impact of frailty on the potential of pulmonary rehabilitation.
- Discuss whether pulmonary rehabilitation may impact frailty in people with chronic respiratory diseases.

Frailty in older population

Fig. 1. Criteria for the diagnosis of frailty and sarcopenia.

- Frail older people have increased risk of morbidity, institutionalization and death, resulting in burden to individuals, their families, health care services and society.
- Although frailty is usually linked to age-related decline, chronic respiratory diseases can accelerate the rate of decline and hasten a frail state.



Frailty and pulmonary rehabilitation

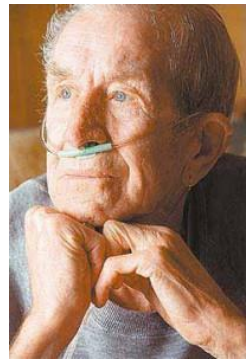
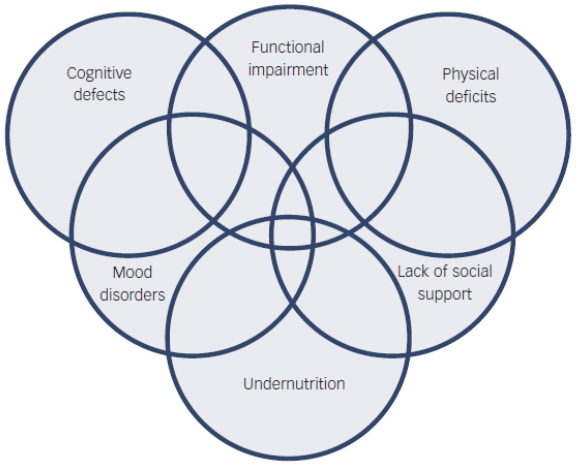
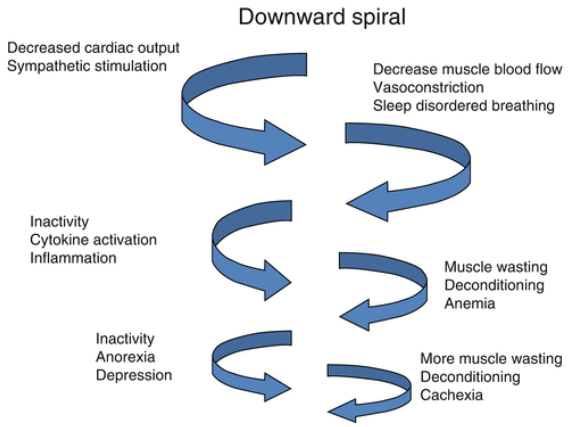


Figure 1: Overlapping Domains of Frailty





Pulmonary rehabilitation

- Muscle function
- Dyspnea
- Exercise capacity
- QOL
- Anxiety and depression
- Survival
- Impact on health expenditures
  - ↓ exacerbations
  - ↓ emergency consultations
  - ↓ duration of hospitalizations
  - ↓ the number of readmission

Lacasse et al. Cochrane Database Syst Rev. 2002 et 2015 Feb 23;2:CD003793.

Frailty prevalence in people with chronic respiratory diseases undergoing PR

691 outpatients **with COPD** undergoing a 8 week-PR
- Age:70 ± 10 years
- FEV1:49 ± 21% predicted.

Robust	Pre-frail	Frail
73 (10%)	459 (66%)	159 (23%)

Maddocks M, et al. Thorax 2016;71:988–995.

1218 patients **with advanced lung disease** undergoing a 12 sessions-PR
- FEV1:23 (IQR 19-28%) % predicted.

Robust / prefrail	Frail
890 (73%)	320 (17%)

Kennedy C et al. Does Pulmonary Rehabilitation Impact Frailty? [abstract]. Am J Transplant. 2015

22 patients **with Interstitial lung disease** undergoing a 12 sessions-PR
- Age:70 ± 8 years

Robust	Pre-frail	Frail
2 (9%)	13(52%)	7 (33%)

(unpublished data)

What are the characteristics of frail patients?

Frailty tended to be more common among women than men

Frailty prevalence increased statiscally with

- Age (*p<0.001*)
- Gold stage (*p<0.01*)
- MRC score (*p<0.001*)
- Comorbidity burden (*p=0.04*)

Maddocks M, et al. Thorax 2016;71:988–995.

	(% meeting criteria)	
Exhaustion	65	86
Weak handgrip strength	44	57
Low physical activity	36	43
Slow gait speed	24	29
Unintentional weight loss	14	100

Maddocks M, et al. Thorax 2016;71:988–995.

Quebec study

Effectiveness of PR in people with chronic respiratory disease

❖ Clinical outcome

Table 3 Comparison of clinical outcomes following pulmonary rehabilitation according to frailty status

	Not frail (n=69)	Prefrail (n=390)	Frail (n=115)	p Value
MRC	0.1 (−0.3 to 0.5)	−0.5 (−0.7 to −0.4)	−1.4 (−1.1 to −1.7)*†	<0.001
SMI (kg/m²)	0.6 (0.5 to 1.1)	0.5 (0.2 to 0.7)	0.5 (0.1 to 0.8)	0.90
Handgrip (kg)	−0.2 (−1.2 to 0.9)	1.2 (0.8 to 1.5)	1.6 (1.0 to 2.3)*	0.002
Peak QMVC (kg)	2.7 (1.1 to 4.3)	1.9 (1.2 to 2.5)	1.8 (0.8 to 2.7)	0.55
Below QMVC cut-point (%)	6.4 (−1.4 to 14.1)	−21.74 (−17.7 to −25.3)	−36.6 (−24.8 to −46.9)*†	<0.001
4MGS (m/s)	0.08 (0.05 to 0.12)	0.07 (0.05 to 0.08)	0.11 (0.09 to 0.14)	0.004
ISWT (m)	17.8 (−21.7 to 57.3)	51.8 (24.4 to 79.2)	145.9 (108.6 to 183.2)*†	<0.001
CRQ dyspnoea score	3.8 (1.4 to 6.2)	4.4 (3.3 to 5.4)	6.8 (5.0 to 8.5)	0.006
CRQ fatigue score	−0.8 (−3.2 to 1.5)	3.1 (2.1 to 4.0)	6.1 (4.6 to 7.7)*†	<0.001
CRQ emotional score	−0.5 (−2.6 to 3.7)	4.0 (2.4 to 5.6)	8.6 (5.6 to 11.5)*†	<0.001
CRQ mastery score	0.7 (−1.1 to 2.4)	3.1 (2.1 to 4.1)	5.2 (3.4 to 6.9)*†	<0.001
Self-reported weekly energy expenditure (kcal)	1276.0 (714.1 to 1838.0)	606.2 (390.0 to 822.5)	767.1 (546.4 to 987.8)	0.08
Self-reported time in moderate activity (min/week)	417.5 (184.7 to 650.4)	137.0 (75.2 to 198.9)	190.3 (127.4 to 253.3)	0.006
CAT score	0.4 (−1.4 to 2.1)	−1.3 (−2.7 to 0.2)	−7.3 (−9.7 to −4.8)*†	<0.001
Katz score	0.0 (−0.1 to 0.1)	0.0 (−0.1 to 0.1)	0.1 (−0.1 to 0.3)	0.73
HADS anxiety	−0.3 (−2.0 to 1.4)	−1.0 (−1.7 to −0.3)	−2.8 (−4.4 to −1.2)*	<0.001
HADS depression	0.9 (−0.2 to 2.1)	−0.8 (−1.4 to −0.1)	−2.9 (−4.0 to −1.7)*†	<0.001

Values are mean change (95% CI) pre-to-post rehabilitation.
*Statistically different to non-frail group.
†Statistically different to prefrail group—tested if ANCOVA p value <0.003 following Bonferroni adjustment for multiple testing.
4MGS, 4-m gait speed; ANCOVA, analysis of covariance; BMI, body mass index; CAT, COPD Assessment Test; CRQ, Chronic Respiratory Disease Questionnaire; HADS, Hospital Anxiety and Depression scale; ISWT, incremental shuttle walk test; kcal, kilocalorie; MRC, Medical Research Council; QMVC, quadriceps maximum voluntary contraction; SMI, skeletal muscle mass index.

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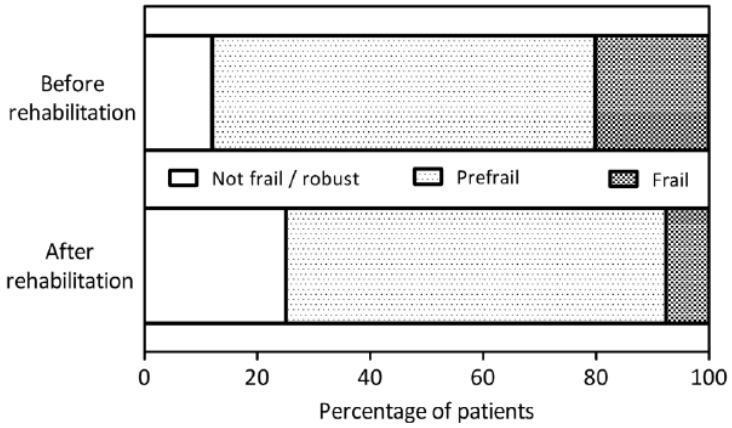
Effectiveness of PR to change frailty status

❖ Frailty status



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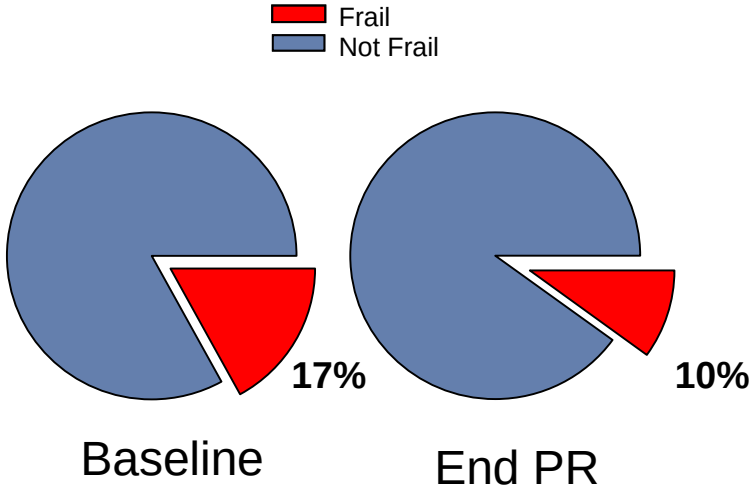

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PR could induce a shift from physical frailty towards a more robust status

Impact on exacerbations and hospitalisations

❖ Rate of acute exacerbations and hospitalizations

	Pre PR	Post PR	Post-Pre PR
	Total (Mean±SD)	**Total (Mean±SD)**	**p Value**
Exacerbations	43 (1.4±0.00)	15 (0.5±0.9)	<0.001
Hospitalisations	15 (0.5±0.7)	3 (0.1±0.3)	0.012

Kola Akinlabi, et al.European Respiratory Journal 2018 52: PA3642

Challenge of PR in frail people with chronic respiratory disease

❖ Rate completion

Rate completion is compromise in frailty people

Rate of candidates completed PR	
Not frail	84%
Pre-frail	75%
Frail	55%

Maddocks M, et al. Thorax 2016;71:988–995.

Multivariate logistic regression for variables associated with non-completion of PR in patients with COPD (n=816)

Multivariate	Adjusted OR (95% CI)	p Value
Age	0.964 (0.944 to 0.984)	0.001
ISWT distance	0.998 (0.997 to 1.000)	0.026
CAT score	1.024 (0.998 to 1.051)	0.07
Frailty status, yes / no	2.195 (1.392 to 3.463)	0.001

ISWT, incremental shuttle walk test; CAT, COPD Assessment Test

Maddocks M, et al. Thorax 2016;71:988–995.

Conclusion and key message

Despite the only few literature available

- Frailty seems highly prevalent in patients with chronic respiratory disease involved in **PR**.
- By decreasing breathless, and improving exercise capacity, functional and frailty state as well the rate of acute exacerbation and hospitalisation, **PR** remains effective as an intervention in this subgroup of patient.
- Frailty is an important independant risk factor for programme non-completion.
- Special attention is required to implement tailored strategies to keep frail patients fully engaged in PR.
- Future research should thus identify how best to support patients who are frail through pulmonary rehabilitation.

Thank you for your attention