UNIVERSITÉ DE GENÈVE

FACULTÉ DE MÉDECINE

Hôpitaux Universitaires Genève

Nutrition et BPCO

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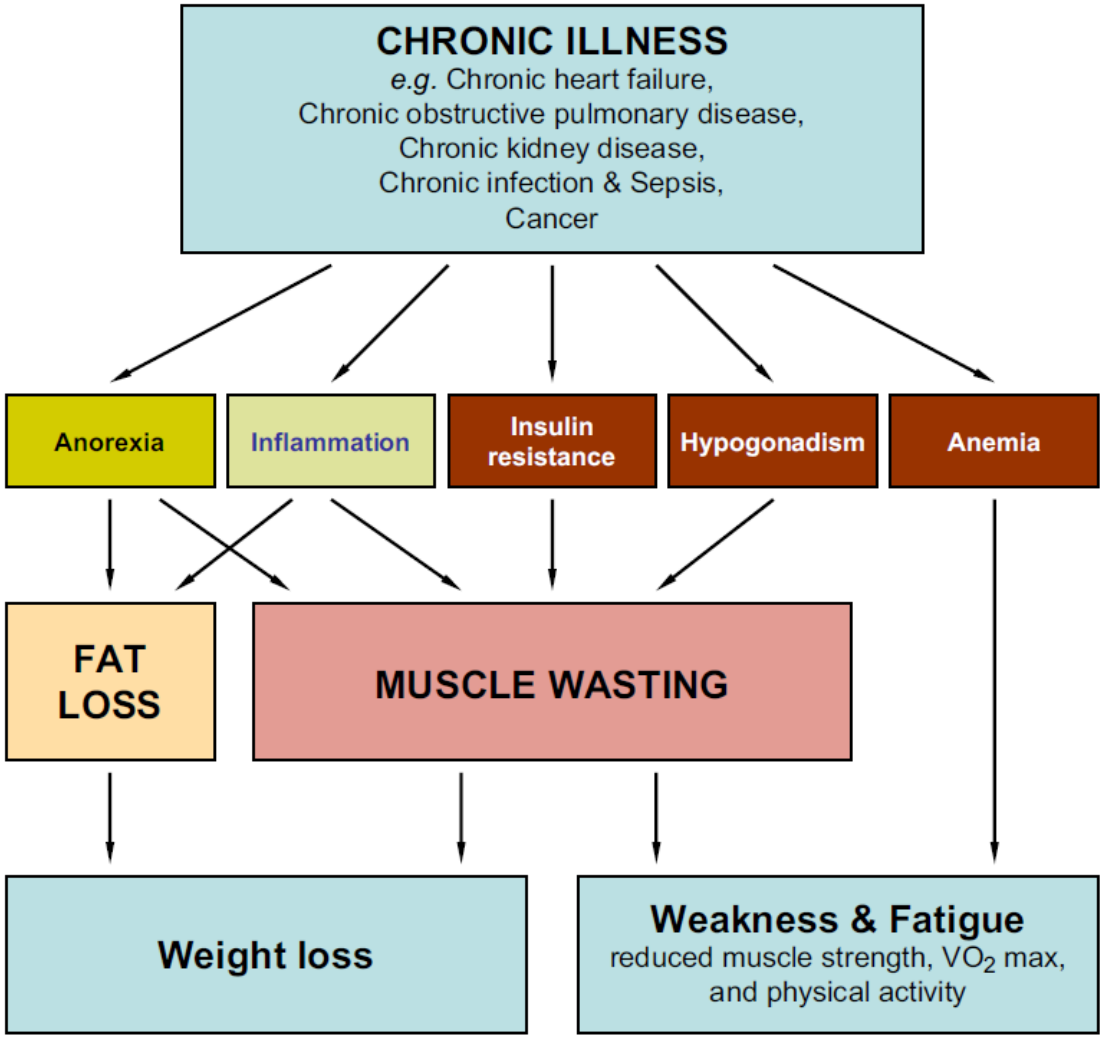
Hôpitaux Universitaires de Genève

Définition de la dénutrition



Evans et al, Clin Nutr, 2008, 27: 793-799

Prévalence de la dénutrition

Table 1 Estimates for the prevalence of cachexia in several chronic illnesses in Europe, the USA, and Japan

	Prevalence in population (%)	Patients at risk (%)	Prevalence in patients at risk (%)	Patients in Europe	Patients in the USA	Patients in Japan	1-Year mortality (%)
COPD (moderate severity)	3.5	15	35	1 400 000	600 000	230 000	15–25
CHF (NYHA II-IV)	2.0	80	10	1 200 000	510 000	200 000	20–40
Cancer	0.5	90	30 (all types)	1 000 000	430 000	170 000	20–80
Rheumatoid arthritis (severe form)	0.8	20	10 (cachexia)	120 000	50 000	20 000	5
CKD	0.1	50	50	190 000	80 000	30 000	20

Population assumptions (2013/14): Europe—742 million, the USA—319 million, and Japan—127 million.

Von Haehling et al, J Cachexia Sarcopenia Muscle 2016 , 7, 507-509

Mme RS, 56 ans

Hospitalisée pour décompensation respiratoire sur embolie pulmonaire (3.4.2012). Perte pondérale de 20 kg en 6 ans.

Co-morbidités

- BPCO sur tabagisme
- s/p Ca sein g en 2001 traité par tumorectomie, radio- et chimiottt

Traitements

Sortis, Prednisone, Cipralex, Clexane, Sintrom, Symbicort, Spiriva

Poids 37.8 kg, taille 164 cm, BMI 14.1 kg/m^2
Apports nutritionnels per os (y. c. 1 supplément nutritionnel) = env. 1200 kcal/j

Est-ce que la patiente est dénutrie?

Nutritional Risk Screening (NRS)

Dénutrition	
Score 1	Perte poids >5% en 3 mois ou apports <50-75% des besoins la semaine précédente
Score 2	Perte poids >5% en 2 mois ou BMI <18.5-20.5 ou apports 25-50% des besoins la semaine précédente
Score 3	Perte poids >5% en 1 mois (>15% in 3 mois) ou **BMI< 18.5** ou apports 0-25% des besoins la semaine précédente
Score:	**0 à 3**

+

Sévérité de la maladie	
Score 1	Fracture de hanche Maladies chroniques: cirrhose, **BPCO**, hémodialyse chronique, diabète, tumeur maligne
Score 2	Chirurgie abdominale majeure, AVC, pneumonie sévère, maladie hématologique maligne
Score 3	Trauma cérébral, transplantation de moelle, soins intensifs (Apache>10)
Score:	**0 à 3**

Kondrup J et al. Clin Nutr 2003

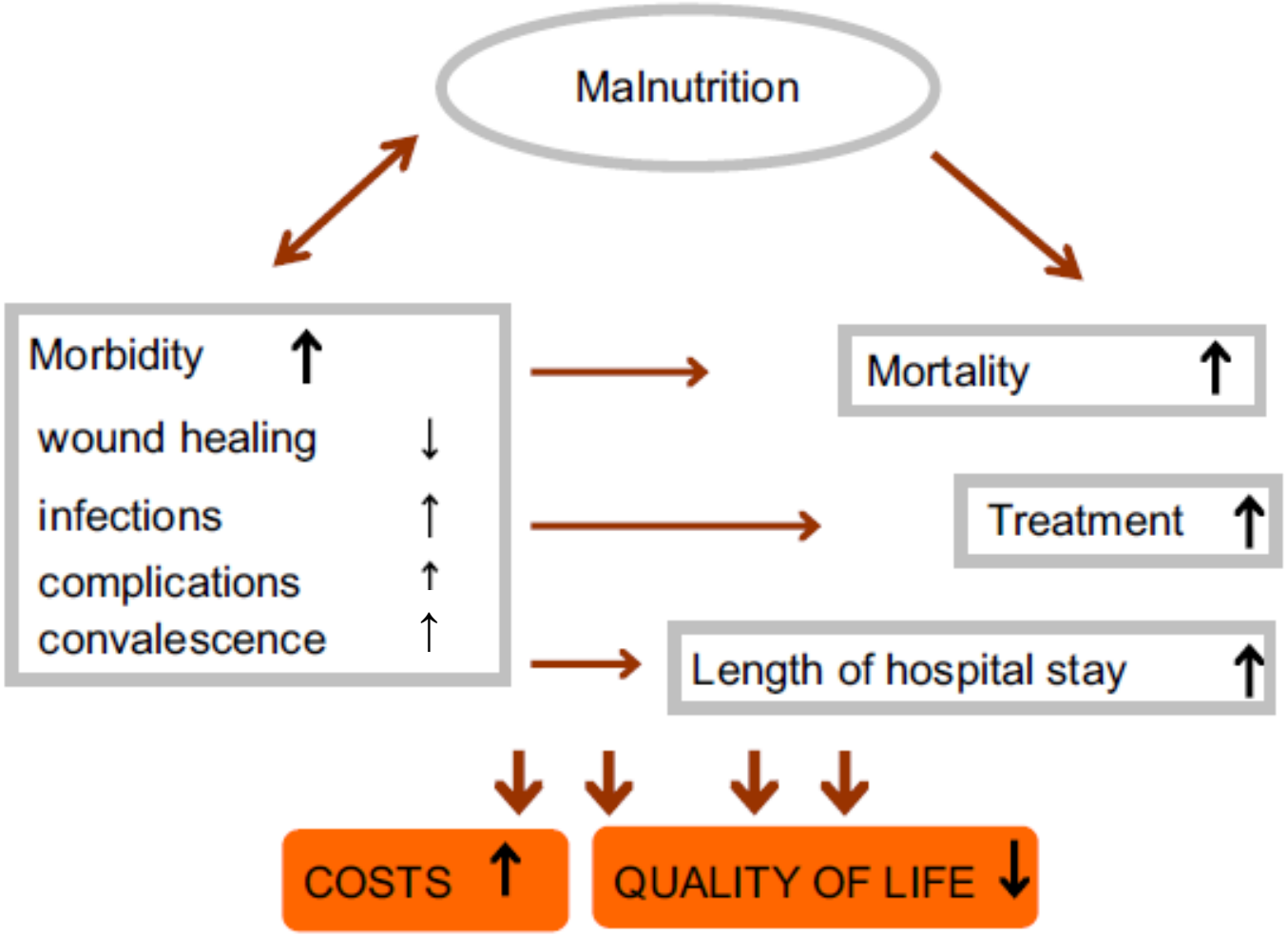
Nutritional Risk Screening (NRS)

- Additionner le score de dénutrition (0-3) et celui de la sévérité de la maladie (0-3)
- Si âge > 70 ans: ajouter 1 point au score total
- Si score total $\geq$ 3: débuter un support nutritionnel

Mme RS a un score de 4.

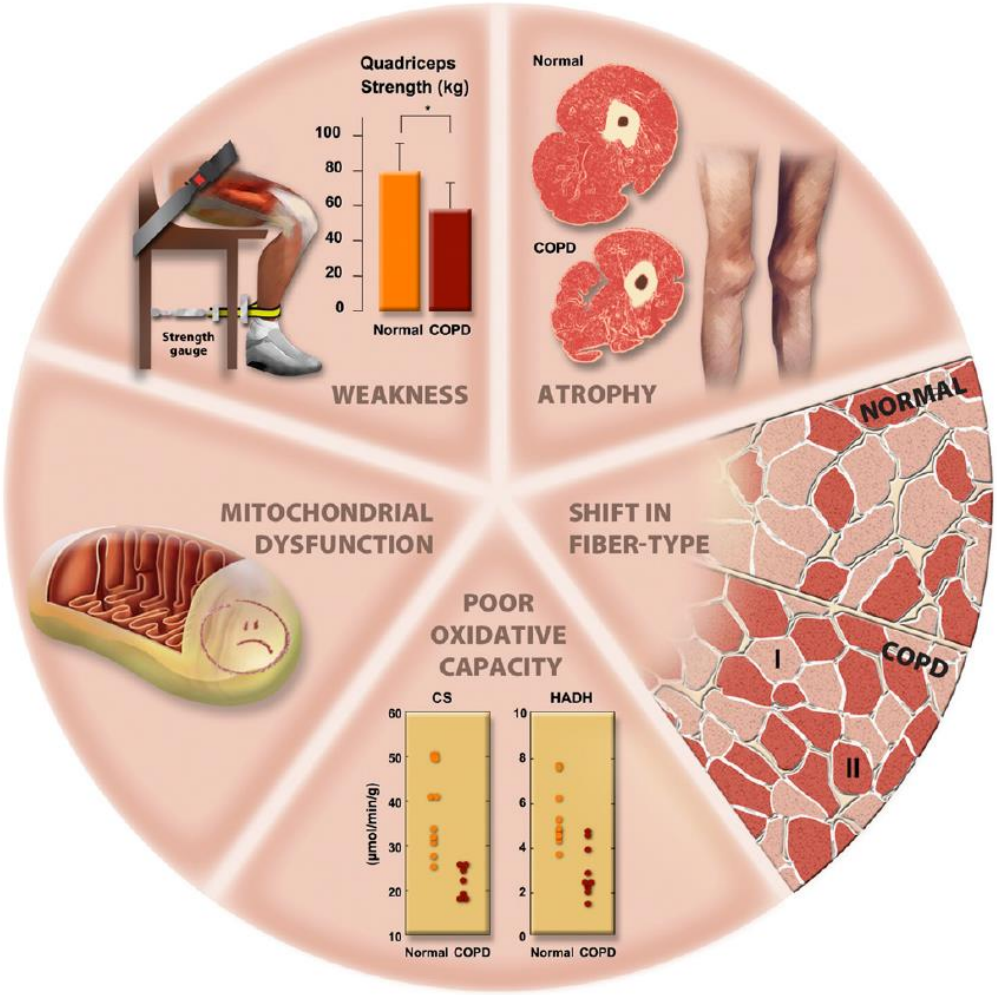
Quel est la conséquence d’une dénutrition chez un patient avec BPCO?

Conséquence de la dénutrition



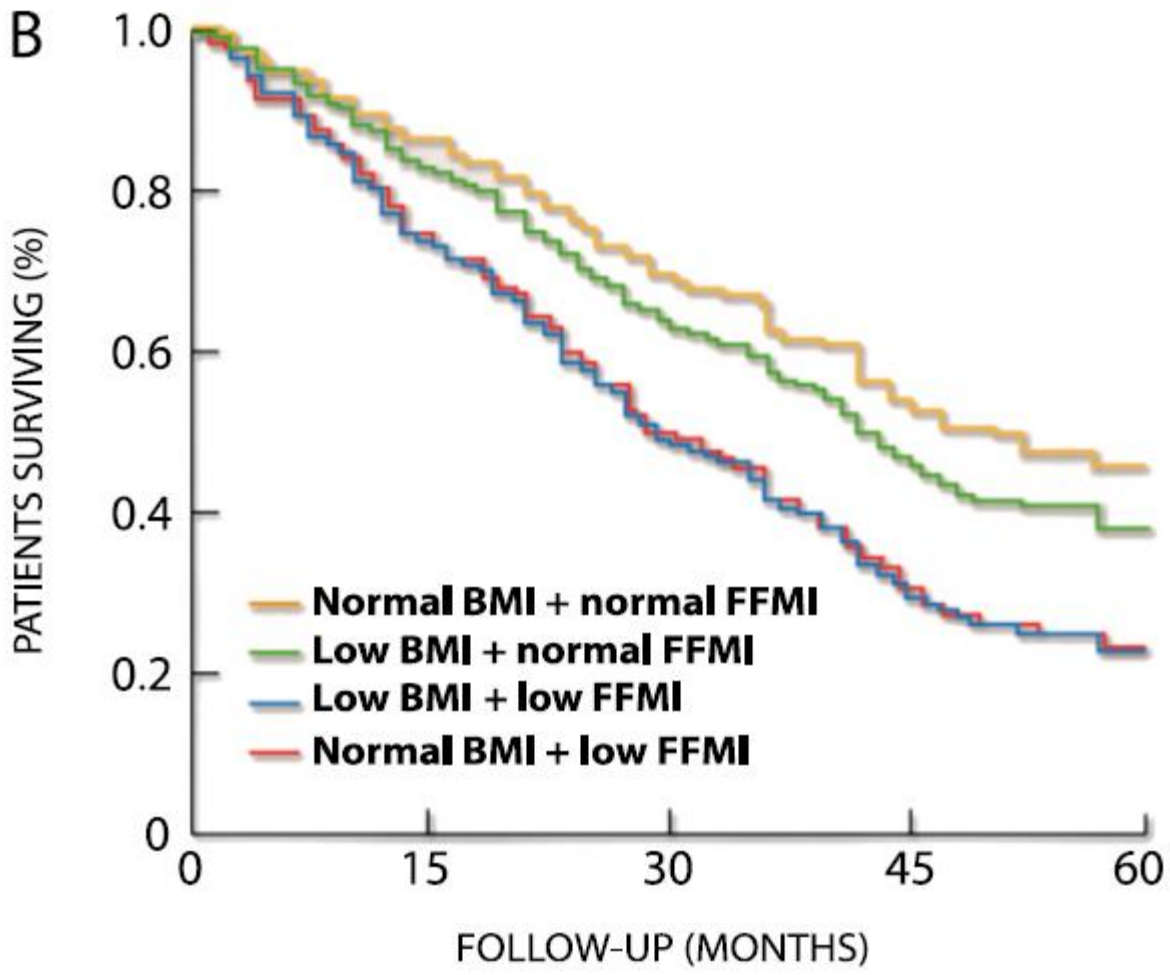
Norman et al. Clin Nutr 2008, 27, 5-15

Altérations musculaires appendiculaires en cas de BPCO



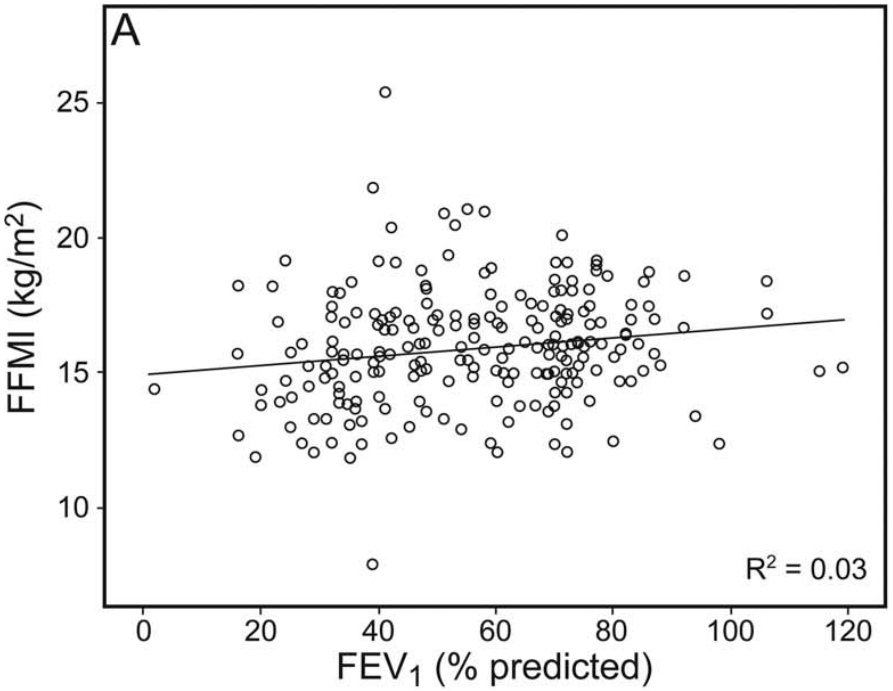
Maltais et al. Am J Resp Crit Care Med 2014, 189:e15-62

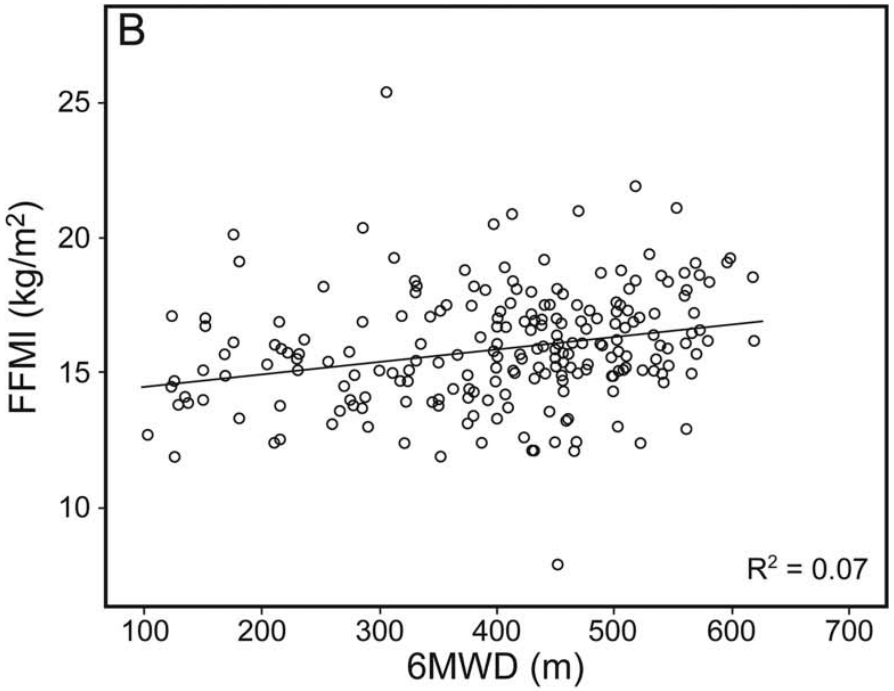
Masse musculaire et mortalité en cas de BPCO



Maltais et al. Am J Resp Crit Care Med 2014, 189:e15-62

Masse musculaire et fonction respiratoire en cas de BPCO





Luo et al. Resp Care 2016, 61(5), 680-8

Comment traiter la dénutrition?

Tel secrétariat de l’unité de nutrition HUG:
022 37 29 348

Types de supports nutritionnels

NRS ≥3

Intestin fonctionnel

Oui

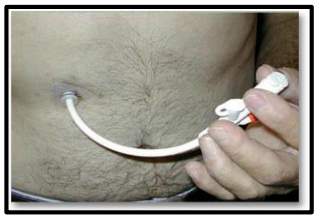
Non

Nutrition parentérale

1. Enrichissement de l'alimentation:
   - Matières grasses
   - Collations

2. Suppléments nutrititionnels oraux

3. Nutrition entérale
   - < 2-3 sem: sonde naso-gastrique, naso-jéjunale ou naso-duodénale
   - > 2-3 sem: gastro- ou jéjunostomie



Anker et al, Clin Nutr, 2009, 28; 455-460

ASPEN Board of Directors and the Clinical Guidelines Task Force, JPEN, 26 (1Suppl), 1SA-138SA, 2002

Löser et al, Clin Nutr, 24, 848-861, 2005

Remboursement

La nutrition entérale et parentérale est à la charge de l'assurance de base :

- Solutions
- Matériel lié à la nutrition

} pas de tarif officiel

- Prestations pharmaceutiques
- Prestations infirmières

} tarif officiel

Les suppléments nutritifs oraux sont à la charge de l'assurance de base depuis le 1.7.2012, **si l'approvisionnement est assuré par un prestataire de soins à domicile reconnu (www.ssnc.ch).**

En pratique: sur le site www.ssnc.ch -> homecare -> sélectionner l'assurance du patient -> remplir le formulaire selon l'assurance du patiente

Mme RS, 56 ans

Nutrition entérale par sonde du 03.04.-17.05.2012 (sortie de l'Hôpital de Rolle) + testostérone (Andriol ® 40 mg 2x/j).

Mois 3 (01.06.2012)

- 2l O2/min
- Promenades journalières, marche sur tapis de course
- Besoins: env. 1200 kcal (y.c. renutrition). Apports per os/j: 1800-2000 kcal + 2-3 suppléments nutritionnels) -> Prise de 4.5 kg
- Poursuite testostérone

Mois 7 (17.10.2012)

- Réhabilitation 2x/sem aux HUG

Mois 22 (02.02.2014): Greffe bi-pulmonaire au CHUV

Mme RS, 56 ans

Date de l'examen	Poids	Eau corporelle	% EPC *normes [45.5-57.8]*	Masse non grasse (Kg)	% MNG *normes [64.0-75.8]*	Masse non grasse sèche (Kg)	% MNGS *normes [16.4-19.8]*	Masse grasse (Kg)	% MG *normes [24.3-36.0]*
21/02/2014	52.5	27.6	52.6	37.3	71.1	9.7	18.4	15.2	28.9
11/10/2013	49.1	26	53	35	71.2	8.9	18.2	14.1	28.8
06/08/2013	47.6	27	56.7	35.7	74.9	8.7	18.2	11.9	25.1
15/03/2013	45.1	26	57.7	34.2	75.8	8.2	18.1	10.9	**24.2**
24/01/2013	46.5	27.1	**58.3**	35.6	**76.6**	8.5	18.2	10.9	**23.4**
28/09/2012	44	27.2	**61.9**	35.2	**80.1**	8	18.1	8.8	**19.9**
31/07/2012	41.9	26.8	**63.9**	34.3	**81.9**	7.6	18	7.6	**18.1**
01/06/2012	40.3	29.7	**73.6**	37	**91.8**	7.4	18.3	3.3	**8.2**
26/04/2012	35.8	26.5	**74.1**	32.9	**91.8**	6.3	17.7	2.9	**8.2**
12/04/2012	35.6	29.3	**82.4**	35.4	**99.6**	6.1	17.2	0.2	**0.4**
03/04/2012	37.8	31.3	**82.8**	37.4	**98.9**	6.1	**16.1**	0.4	**1.1**

21.02.2014: BMI 19.5 kg/m^2 (03.04.2012: 14.1 kg/m^2)

Effet du traitement nutritionnel

Evidence modérée:

-↑ poids

- ↑ force musulaire respiratoire

- ↑ distance de marche

- ↑ qualité de vie

Ferreira et al, Cochrane Database Syst Rev. 2012, doi: 10.1002/14651858

Quelle est la place de la prise en charge multimodale?

Multimodal nutritional rehabilitation improves clinical outcomes of malnourished patients with chronic respiratory failure: a randomised controlled trial

Christophe M Pison,[1,2,3] Noël J Cano,[4,5,6] Cécile Chérion,[1] Fabrice Caron,[7] Isabelle Court-Fortune,[8] Marie-Thérèse Antonini,[9] Jésus Gonzalez-Bermejo,[10,11] Lahouari Meziane,[12,13] Luis Carlos Molano,[14,15,16] Jean-Paul Janssens,[17,18] Frédéric Costes,[19,20] Bernard Wuyam,[21,22] Thomas Similowski,[10,11] Boris Melloni,[23] Maurice Hayot,[12,13] Julie Augustin,[7] Catherine Tardif,[24] Hervé Lejeune,[25,26] Hubert Roth,[1,2,3,27] Claude Pichard,[18,28] the IRAD Investigators*

Intervention

1) Control (n= 62) : education only

2) Rehabilitation (n=60): Testostérone undécanoate + oral nutritional supplement (188 kcal 3x/d) + exercice 3-5 x/sem

C Pison et al, Thorax, 2011

Table 1 Baseline values in the control and multimodal nutritional rehabilitation groups

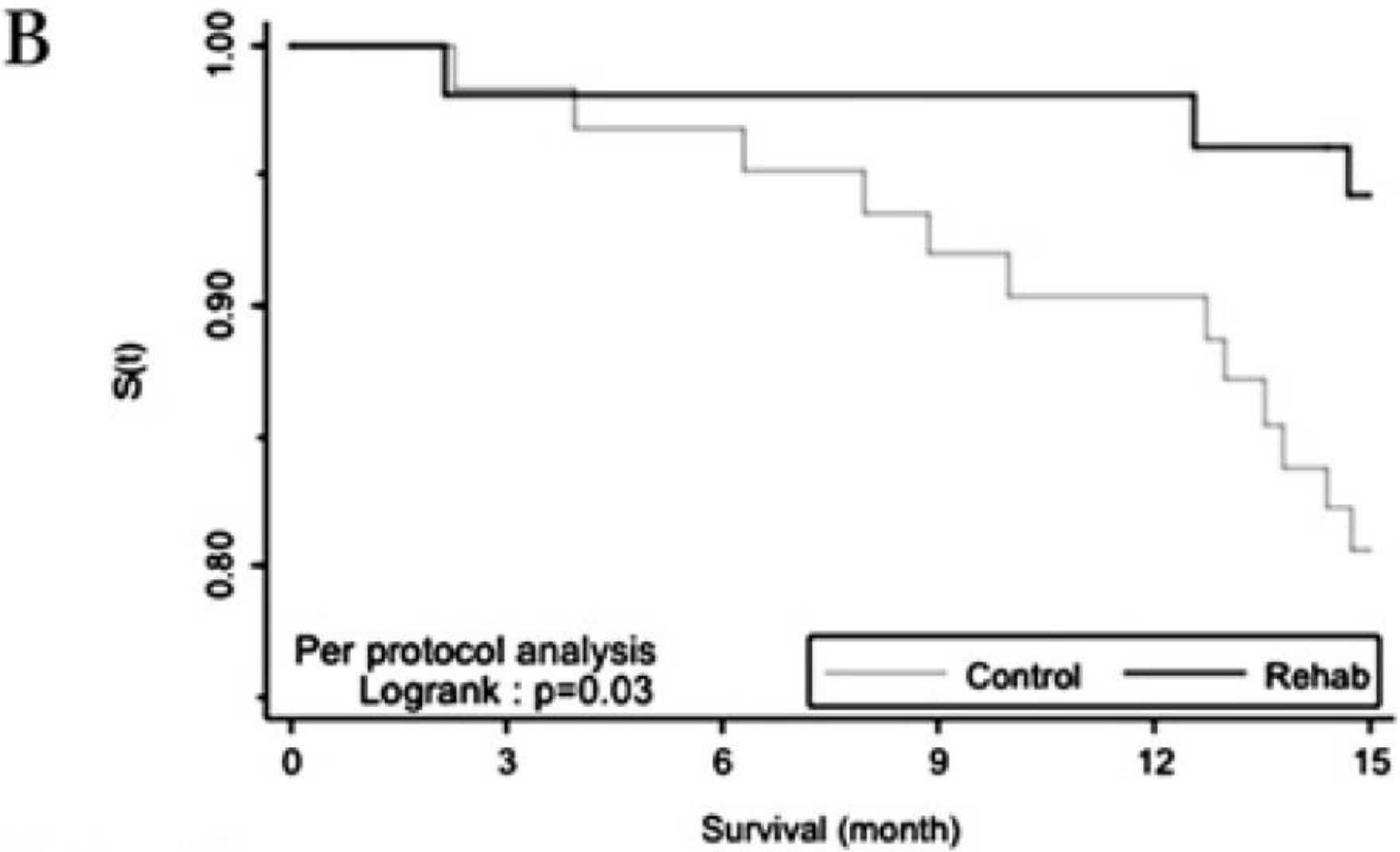
Variable	Control group (N=62)	Rehabilitation group (N=60)
Age, years*	65.1 (9.6)	66.6 (9.6)
Underlying respiratory disease		
COPD, n (%)	49 (79)	45 (75)
Bronchiectasis, n (%)	5 (8)	4 (7)
Restrictive disorders, n (%)	5 (8)	6 (10)
Mixed respiratory diseases, n (%)	3 (5)	5 (8)
Home respiratory assistance		
LTOT, n (%)	40 (65)	38 (65)
LTOT or NIV+LTOT, n (%)	22 (35)	22 (35)
Pulmonary function and gas exchange		
FEV_1, l	0.76 (0.32)	0.83 (0.31)
FEV_1, % predicted	30.0 (12.0)	32.6 (13.5)
Room air Pa_{O_2}, kPa	7.7 (1.3)	7.7 (1.1)
Room air Pa_{CO_2}, kPa	5.9 (0.9)	5.8 (1.0)
Nutritional and inflammatory status		
BMI, kg/m^2	21.4 (4.0)	21.5 (3.8)
FFMI, men	16.8 (2.3)	15.8 (1.7)

Prise en charge multimodale

	Changes (month 3 - 0)		
	Control	Rehab.	p
BMI (kg/m^2)	0.09	0.62	<0.01
Fat-free mass index (kg/m^2)	-0.15	0.51	0.01
Isometric quadriceps force (N)	0.55	28.6	<0.01
Time to exhaustion (min)	-1.4	4.8	<0.01
6-min walk distance (m)	-1.7	12.1	0.15
Quality of life (CRQ)			
Men	2.9	5.1	0.62
Women	1.5	17.7	<0.01

CRQ: chronic respiratory disease questionnaire

C Pison et al, Thorax, 2011



Number at risk						
Control	62	61	60	57	56	50
Rehabilitation	52	51	51	51	51	48

C Pison et al, Thorax, 2011

Prise en charge multimodale

COPD

Benefits over usual care and pulmonary rehabilitation alone

Further improvement with addition of anabolic steroids

Schols et al, Clin Nutr, 2005

Van de Bool et al, J Cachexia Sarcopenia Muscle, 2017

Testostérone en CH

Nom ®	Forme	Quantité	E.O	Remboursement	Coût
Andriol*	Cp	40 mg	60 cp	LS 10% (LIM)	46.95
Nebido*	Inj	1000 ml/4 ml	1 flacon	LS (LIM)	159.60
Tostran	Gel	20 mg/g	60 schts	complémentaire	?
Testogel*	Gel	50 mg/5g	60 schts	complémentaire	?
Testoviron dépôt	Inj i.m.	250 mg	3 ampoules	complémentaire	55.65

* Disponibles aux HUG (08.2017)

Courtesy of A. Limonta

Conclusion

- Sous-diagnostic de la dénutrition
- Diagnostic grâce au NRS (BMI, perte poids, apports alimentaires + sévérité de la maladie + âge)
- Amélioration de l'état nutritionnel associée avec amélioration du pronostic
- Traitement par supplément nutritionnel souvent insuffisant, recours souhaitable à une nutrition entérale
- Association avec une réhabilitation pulmonaire et un traitement anabolisant à la testostérone

Merci pour votre attention!

Screening et diagnostic

Risk screening

At risk for malnutrition

- Use validated screening tools

Diagnostic Assessment

Assessment criteria

- **Phenotypic**
  - Non-volitional weight loss
  - Low body mass index
  - Reduced muscle mass
- **Etiologic**
  - Reduced food intake or assimilation
    Disease burden/inflammatory condition

Diagnosis

Meets criteria for malnutrition diagnosis

- Requires at least 1 Phenotypic criterion and 1 Etiologic criterion

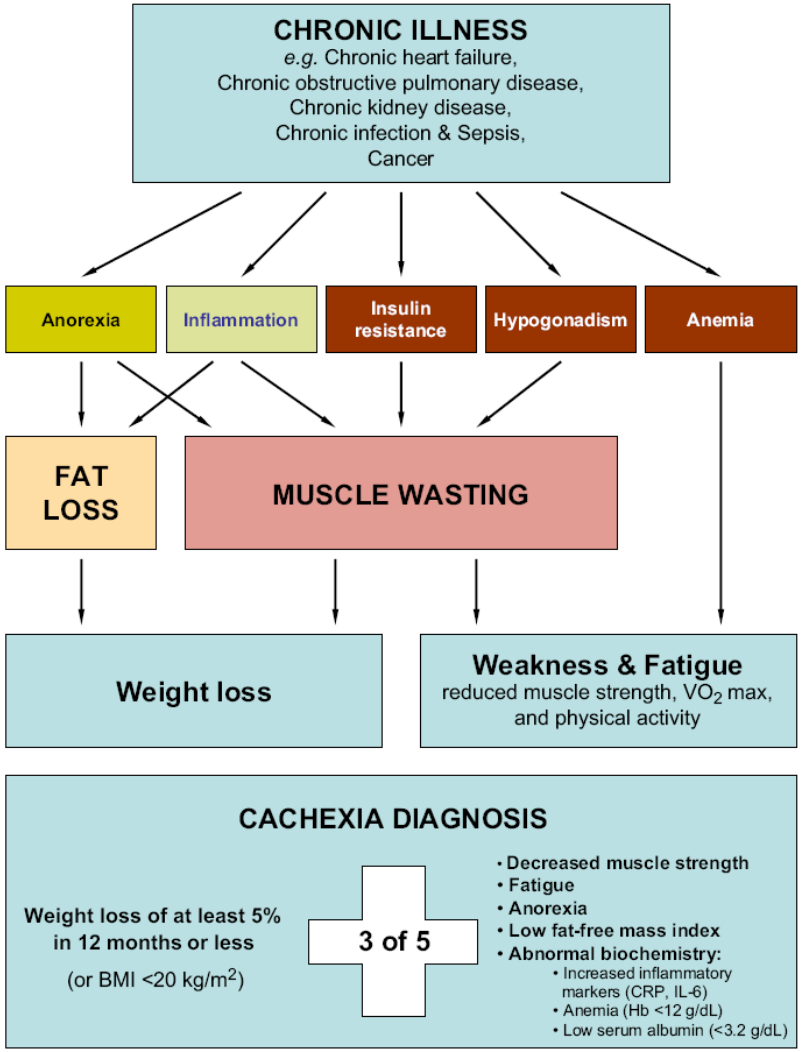
Severity Grading

Determine severity of malnutrition

- Severity determined based on Phenotypic criterion

Cederholm T et al, Clin Nutr 2018

…but not only

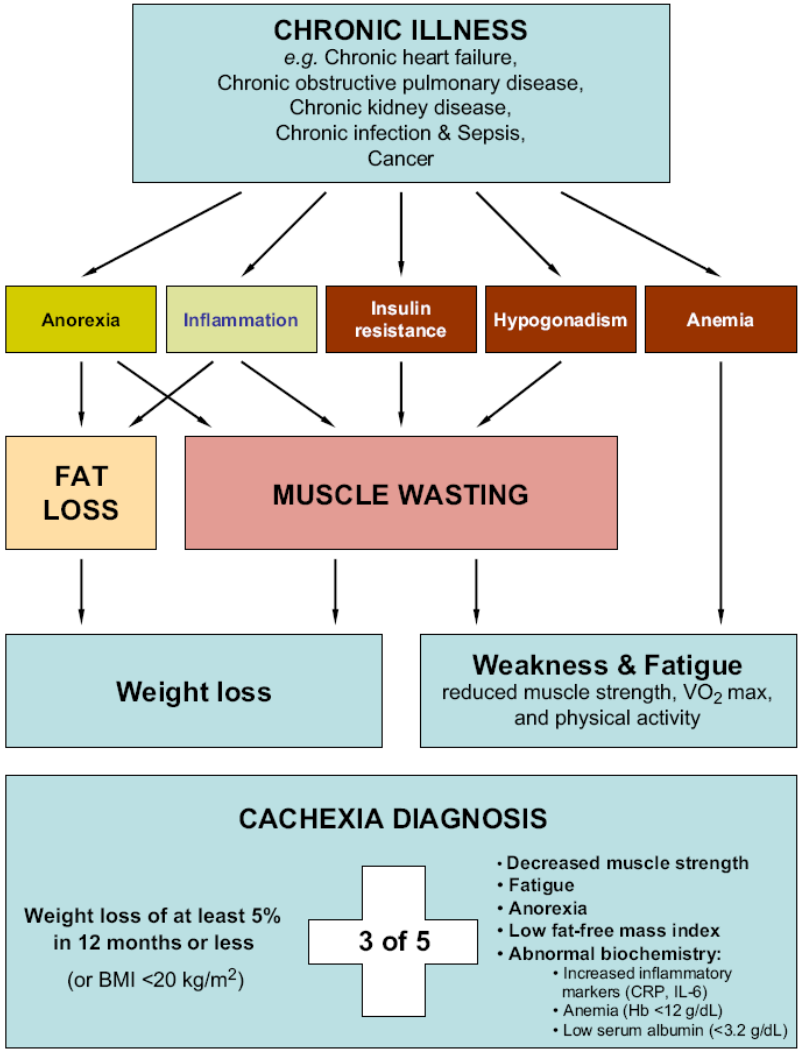


"cachexia is a complex metabolic syndrome associated with underlying illness and characterized by **loss of muscle** with or without loss of fat mass"

…the diagnosis and treatment of cachexia will become important goals to improve **morbidity, mortality, and particularly, the quality of life** "

Evans et al, Clin Nutr, 2008, 27: 793-799

Définition de la cachexie



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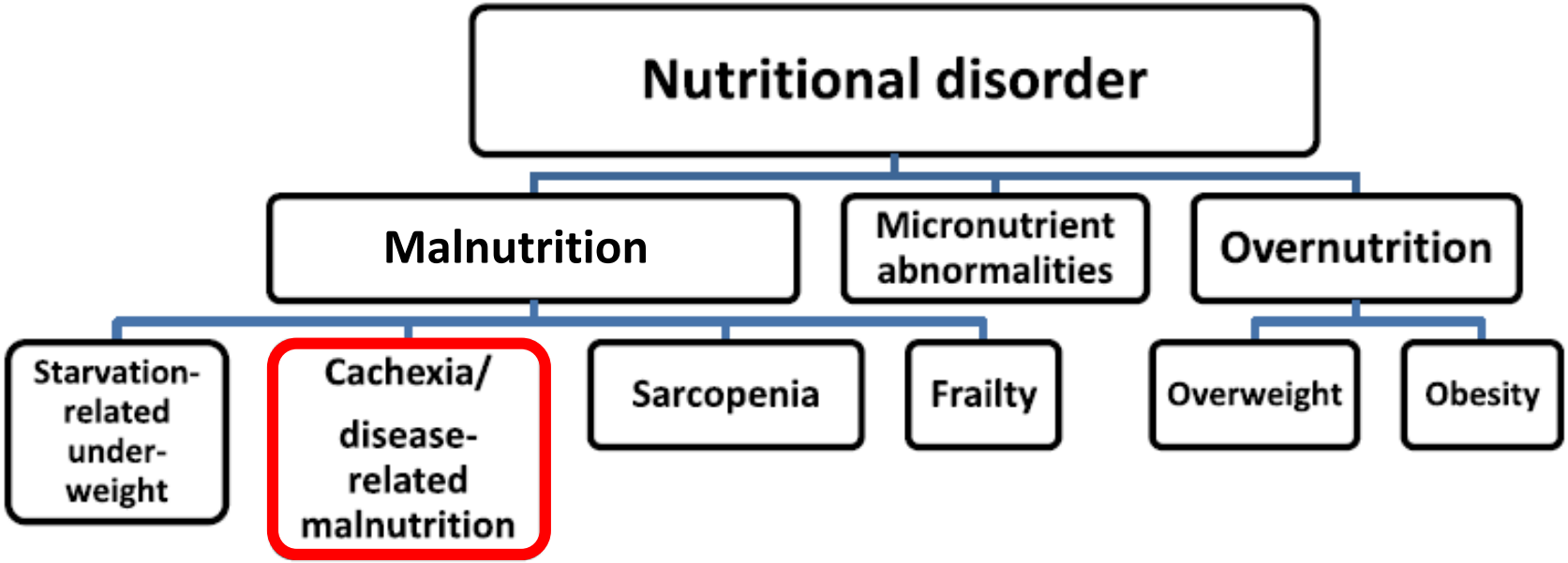


Cederholm et al, Clin Nutr, 2015, 34:335-340

Guidelines ESPEN 2009

Summary of statements: Parenteral Nutrition in Respiratory Medicine			
Subject	**Recommendations**	**Grade**	**Number**
Background	Between 25% and 40% of patients with advanced COPD are malnourished.	B	2.1
	Being underweight and having low fat-free mass are independently associated with a poor prognosis in patients with chronic respiratory insufficiency, especially in COPD.	B	2.2
Indications	There is no evidence showing that gut function is impaired in COPD patients. Therefore, considering that enteral nutrition is less expensive and associated with fewer and less severe complications than parenteral nutrition, enteral nutrition should represent the first approach to patients with COPD in need of nutritional support.	B	2.3
	There is limited evidence that COPD patients intolerant of EN profit from PN. Small studies do however suggest that, in combination with exercise and anabolic pharmacotherapy, PN has the potential to improve nutritional status and function.	C	2.4
Effect of PN	Loss of body weight is correlated with increased morbidity and mortality. However, due to the lack of studies of its effects, it is not possible to be sure if prognosis is influenced by the provision of PN.	B	2.5
Regimen selection	In patients with stable COPD, glucose-based PN causes an increase in the respiratory CO_2 load. PN composition should accordingly be orientated towards lipids as the energy source. There is not sufficient evidence to recommend specific lipid substrates.	B	2.6

Anker et al, Clin Nutr, 2009, 28; 455-460

Nutritional Risk Screening (NRS)

Dénutrition		Sévérité de la maladie	
Légère Score 1	Perte poids >5% en 3 mois ou apports <50-75% des besoins la semaine précédente	Légère Score 1	Fracture de hanche Maladies chroniques: cirrhose, **BPCO**, hémodialyse chronique, diabète, tumeur maligne
Modérée Score 2	Perte poids >5% en 2 mois ou BMI <18.5-20.5 ou apports 25-50% des besoins la semaine précédente	Modérée Score 2	Chirurgie abdominale majeure, AVC, pneumonie sévère, maladie hématologique maligne
Sévère Score 3	Perte poids >5% en 1 mois (>15% in 3 mois) ou **BMI< 18.5** ou apports 0-25% des besoins la semaine précédente	Sévère Score 3	Trauma cérébral, transplantation de moelle, soins intensifs (Apache>10)
Score:	0 à 3 +	Score:	0 à 3 = score total

Kondrup J et al. Clin Nutr 2003

Traitement

- Support nutritionnel + activité physique vs. support nutritionnel: amélioration du devenir

van Wetering CR et al. J Am Med Dir Assoc. 2010;11:179-187.

- Support nutritionnel + activité physique vs. activité physique: amélioration du devenir

Gurgun A, et al. Respirology. 2013;18:495-500.

- Support nutritionnel + activité physique + testostérone vs. sans testostérone.

Schols AM, et al Clin Nutr. 1995;14:64-73.
Pison CM et al, Thorax. 2011;66:953-960.

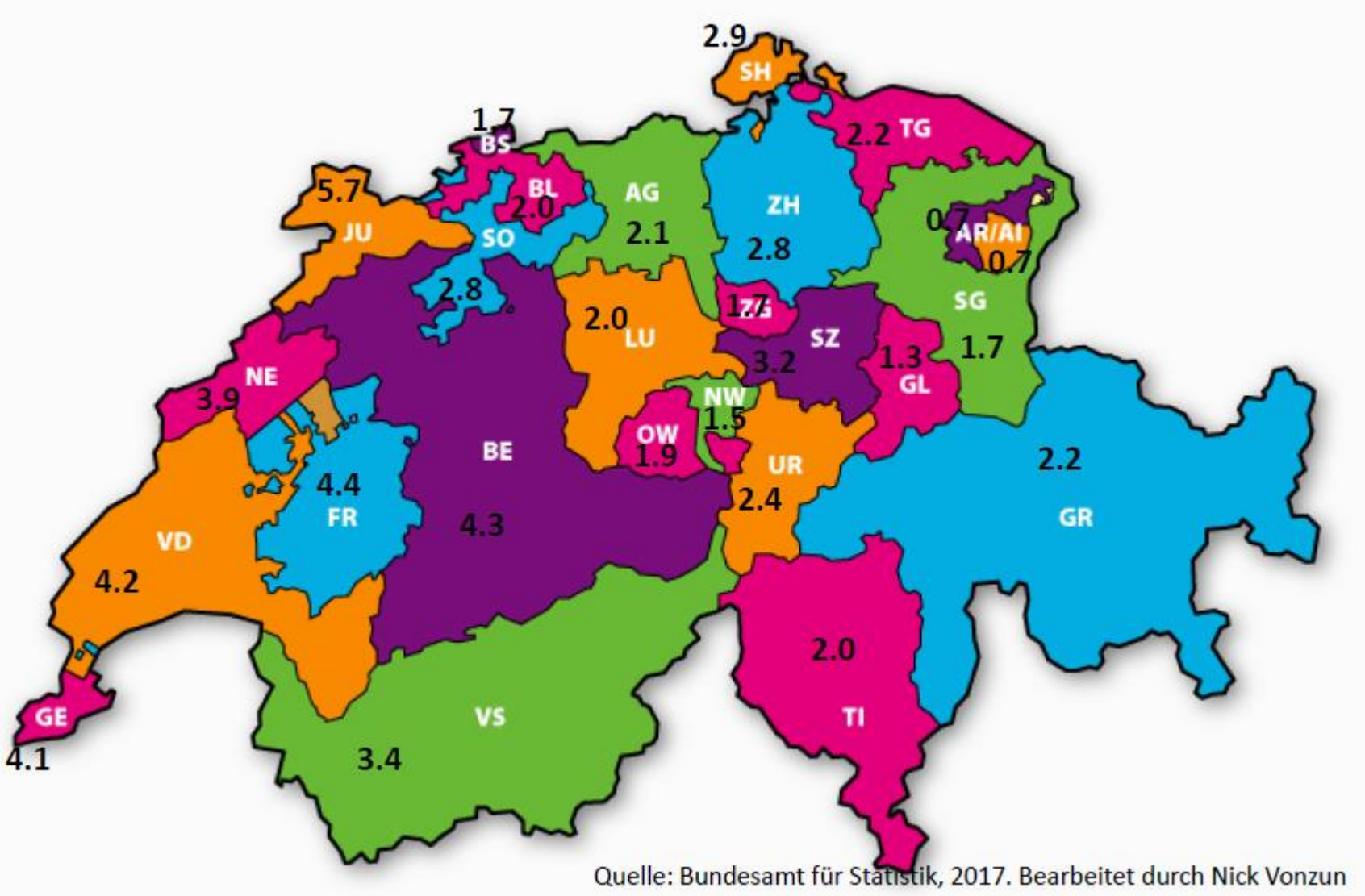
Traitement multimodal en cas de BPCO

Treatment	Mass	Strength	Exercise Tolerance	Survival
Exercise	√ (497)	√ (496, 497)	√ (662)	?
Oxygen	?	?	√ (539–541)	√
Nutrition alone	No (663)	No (663)	No (663)	?
Nutrition with exercise training	√ (552, 554, 567)	√ (554, 567)	√ (552, 554, 567)	?
Nutrition with exercise training and anabolic hormone supplementation	√ (558)	√ (558)	√ (558)	?
Testosterone	√ (466)	√ (466)	No (466, 575)	?
Growth hormones	√ (596)	No (596)	No (596)	?
Ghrelin	?	?	?	?
Megestrol	No (630)	?	No (630)	?
Creatine	?	?	No (633–635)	?
Antioxidants	?	?	?	?
Vitamin D alone	?	?	?	?
Vitamin D with exercise training	?	?	?	?

√: Studies support that the treatment has a favorable effect on the outcome; No: studies support that the treatment has no favorable effect on the outcome; ?: there are no supporting data for a treatment effect on the outcome.

Maltais et al. Am J Resp Crit Care Med 2014, 189:e15-62

Codage de la dénutrition en milieu hospitalier



Effet du traitement nutritionnel

Evidence modérée:

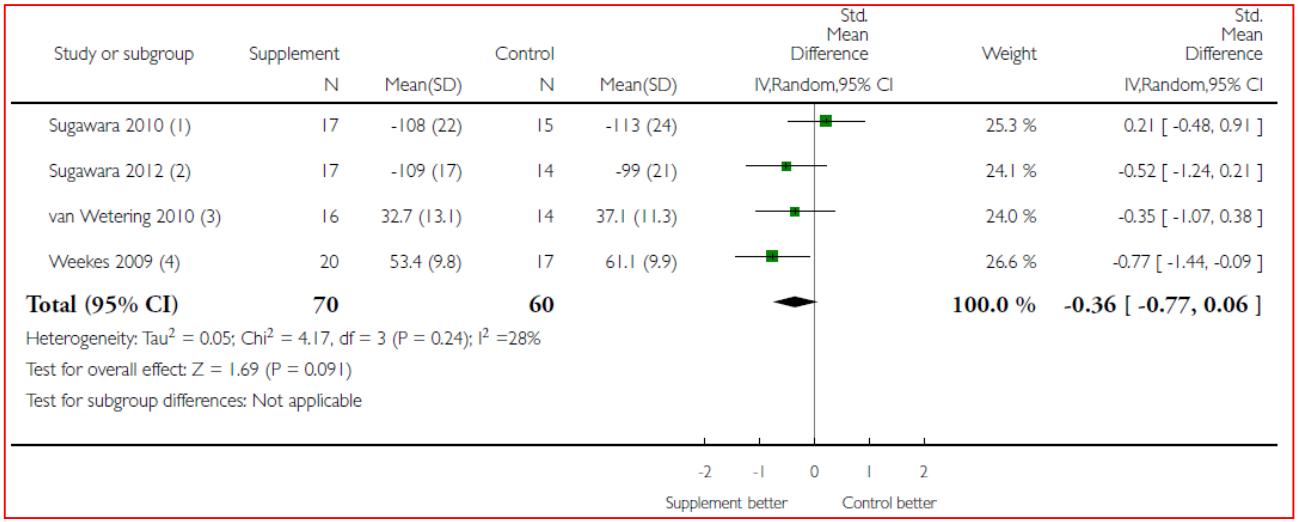
-↑ poids

- ↑ force musulaire respiratoire

- ↑ distance de marche

- ↑ qualité de vie

Ferreira et al, Cochrane Database Syst Rev. 2012, doi: 10.1002/14651858



Study or subgroup	Supplement N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
Sugawara 2010 (1)	17	-108 (22)	15	-113 (24)		25.3 %	0.21 [-0.48, 0.91]
Sugawara 2012 (2)	17	-109 (17)	14	-99 (21)		24.1 %	-0.52 [-1.24, 0.21]
van Wetering 2010 (3)	16	32.7 (13.1)	14	37.1 (11.3)		24.0 %	-0.35 [-1.07, 0.38]
Weekes 2009 (4)	20	53.4 (9.8)	17	61.1 (9.9)		26.6 %	-0.77 [-1.44, -0.09]
Total (95% CI)	**70**		**60**			**100.0 %**	**-0.36 [-0.77, 0.06]**

Heterogeneity: $Tau^2 = 0.05$; $Chi^2 = 4.17$, df = 3 (P = 0.24); $I^2 = 28\%$

Test for overall effect: Z = 1.69 (P = 0.091)

Test for subgroup differences: Not applicable

Effet du traitement nutritionnel

Evidence modérée:

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