Cancer et exercices avant, pendant et après

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Conflit d'intérêt ?

→ Pas de conflit d'ordre financier

Plan

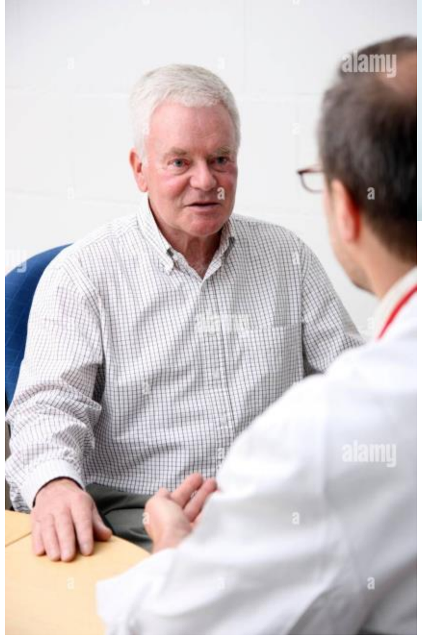
- Prévention primaire
- Préhabilitation (& évaluation pré-op)
- Pendant les traitements (lourds)
- Après les traitements
- Cardio-oncologie

De qui parle t'on ?

Age moyen au diagnostic :

Femmes 68 ans, Hommes 70 ans (2024)

2/3 des patients ont plus de70 ans



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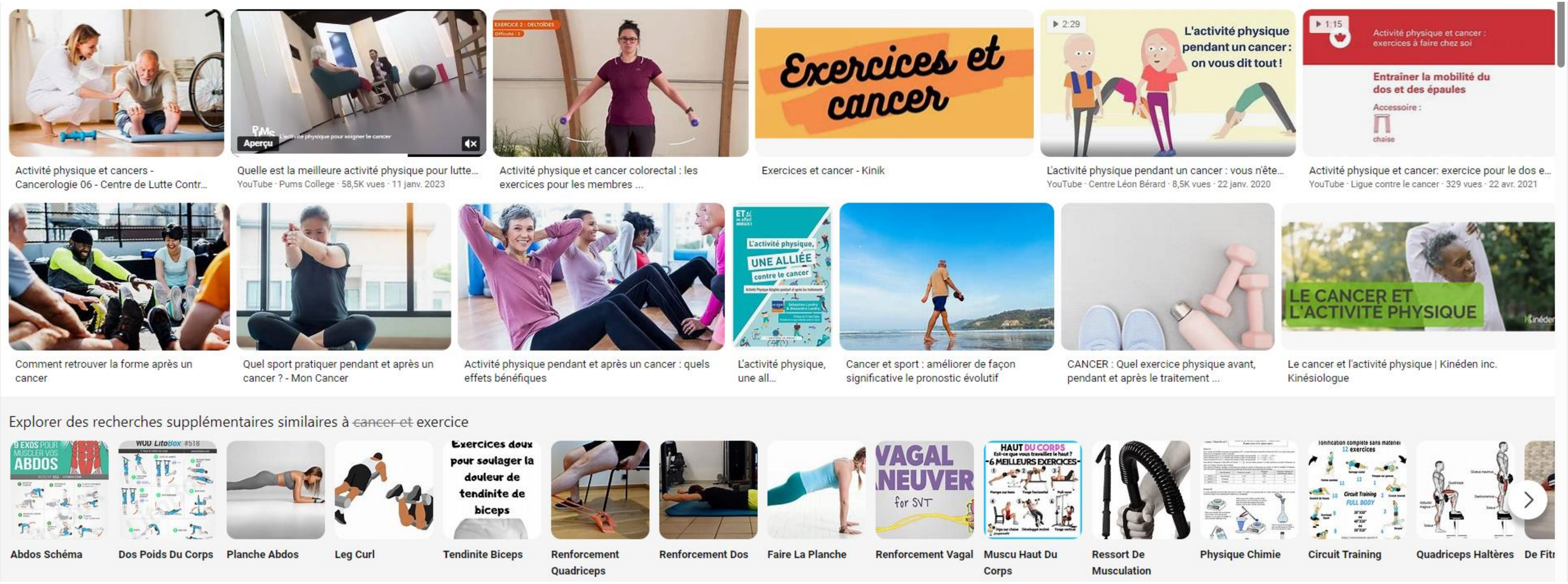
De quoi parle t'on ?

Google « Exercices et cancer »



Prévention primaire

Table 1. Summary of Evidence for the Prevention of Cancer by Physical Activity

Cancer Site	Average Risk Reduction	Level of Scientific Evidence**	No. of Studies
Colon	20-25%	*Convincing*	>60
Breast (postmenopause)	20-30%	*Probably*	>76
Endometrium	20-30%	*Probably*	>20
Breast (postmenopause)	27%	*Limited suggestive*	>33
Prostate	10-20%	*Limited suggestive*	>20
Lung	20-40%	*Limited suggestive*	>20
Ovary	10-20%	*Limited suggestive*	>20
Pancreatic	40-50%	*Limited suggestive*	>20
Gastric	30%	*Limited suggestive*	>15

*Sources: Data summarized from: Friedenreich et al. (2004); Tardon et al. (2005); Miles, 2007; Olsen et al. (2007); Voskuil et al. (2007); WCRF/AICR (2007)**; Gierach et al. (2009); Harriss et al. (2009); Leitzmann et al. (2009b); Wolin et al. (2009); Bernstein et al. (2010); Friedenreich et al. (2010a); Lynch et al. (2011); Speck et al. (2011); Loprinzi et al. (2012)

Cancer et exercices

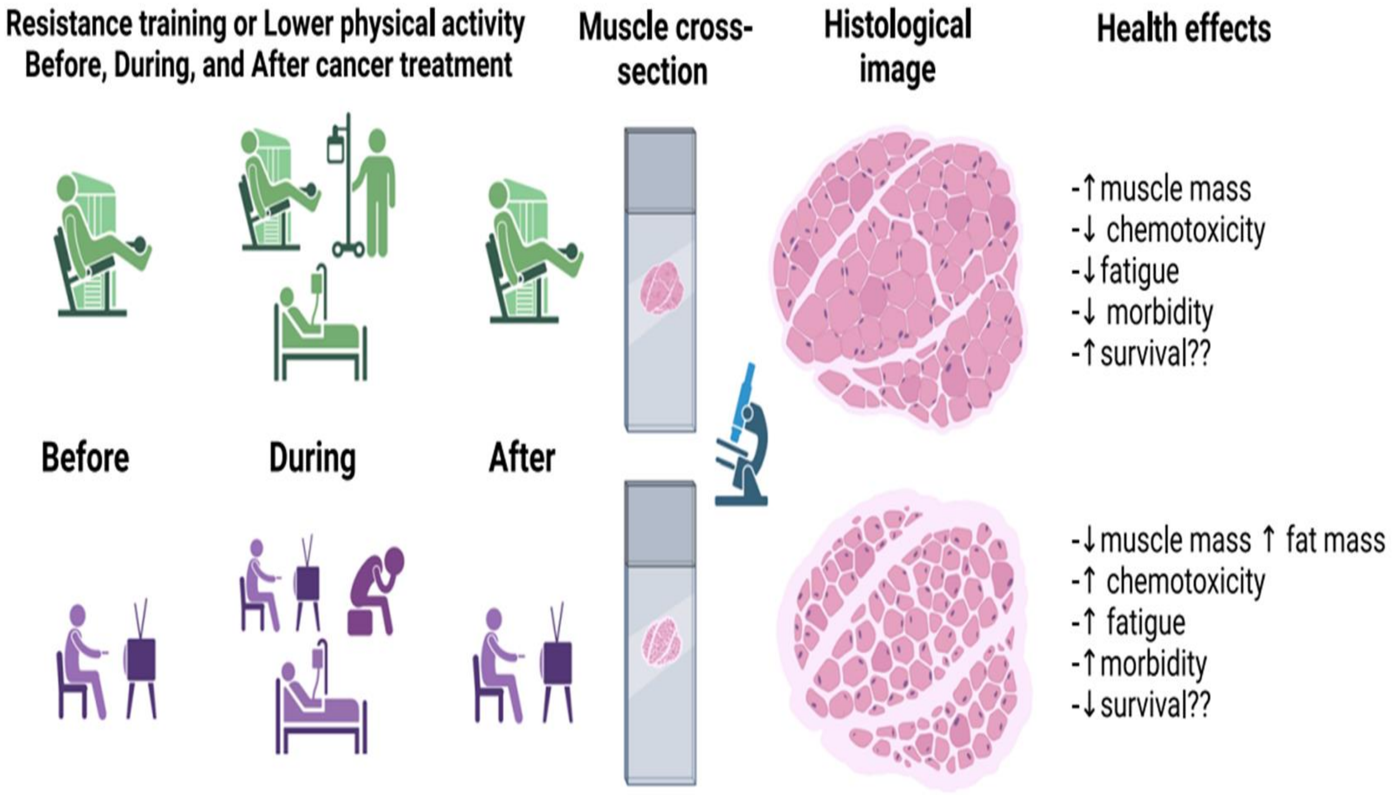
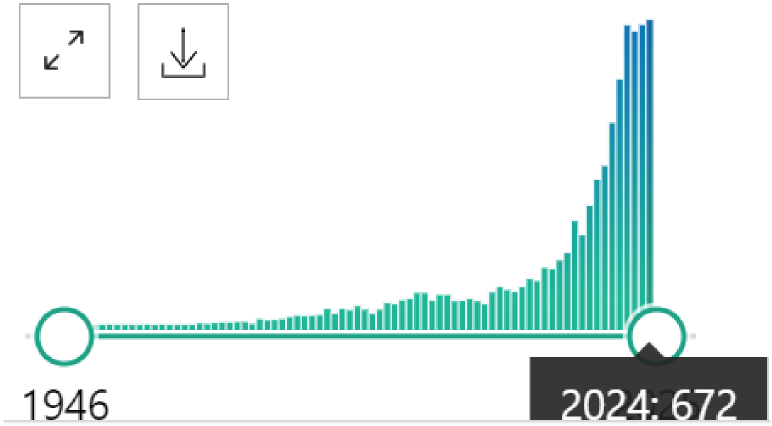


Figure 3. Impact of resistance training to enhance physical function, quality of life, and cancer survivorship.

Prévention secondaire

Sawan, Exer Sport & Mov, 2023



Préhabilitation

Prehabilitation: Who can benefit?

Miquel Coca-Martinez, Franco Carli, Eur J Surg Oncol 2023

Prehabilitation is an intervention that occurs between cancer diagnosis and the start of an acute treatment. **It involves physical, nutritional, and psychological assessments** to establish a baseline functional level and provide targeted interventions to improve a person's health and prevent future impairments. Prehabilitation has been applied to surgical oncology and has shown positive results at **improving functional capacity, reducing hospital stay, decreasing complications, and enhancing health-related quality of life**. The importance of collaboration between various healthcare professionals and the implementation of multimodal interventions, including exercise training, nutrition optimization, and emotional support is discussed in this manuscript. The need for screening and assessment of conditions such as sarcopenia, frailty, or low functional status in order to identify patients who would benefit the most from prehabilitation is vital and should be a part of all prehabilitation programs. Exercise and nutrition play complementary roles in prehabilitation, enhancing anabolism and performance. However, in the presence of malnutrition and sarcopenia, exercise-related energy expenditure without sufficient protein intake can lead to muscle wasting and further deterioration of functional capacity, thus special emphasis on nutrition and protein intake should be made in these cases. Finally, the challenges and the need for a paradigm shift in perioperative care are discussed to effectively implement personalized prehabilitation programs.

Poumons

Functional evaluation of the lung resection candidate

C.T. Bolliger, A.P. Perruchoud

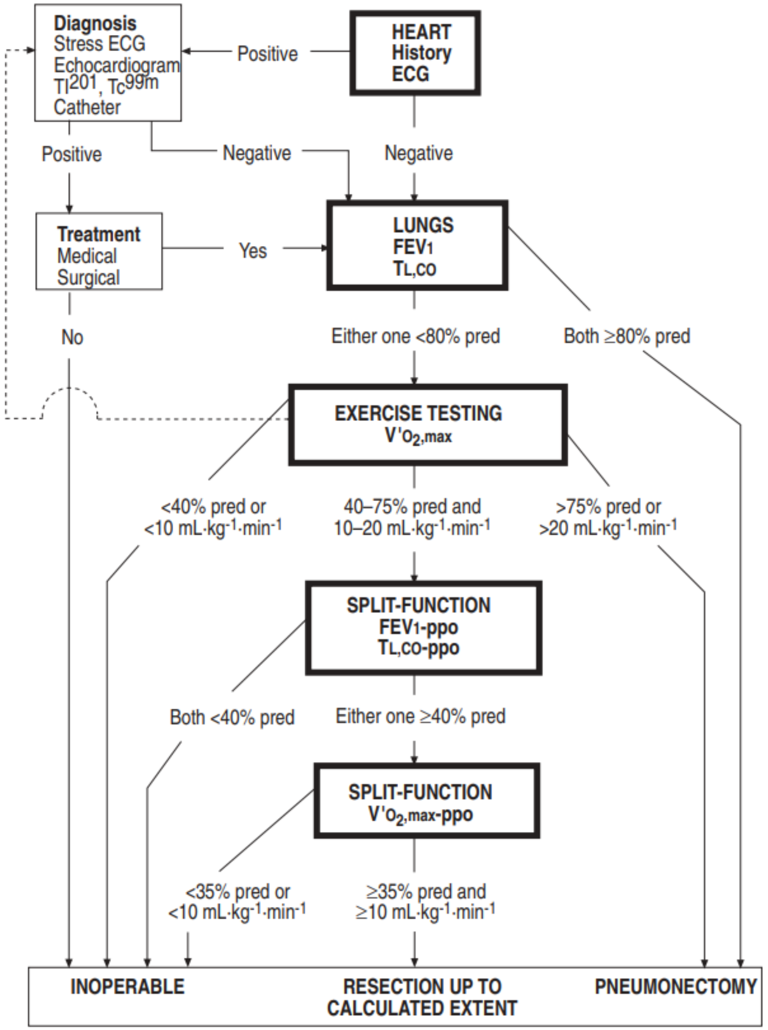


Fig. 1. – Algorithm for the assessment of the cardiorespiratory reserves (functional operability) of lung resection candidates. Patients undergo successive steps of functional investigation from top to bottom, until they qualify for varying extents of resection or are deemed inoperable. The "safety loop" for patients with cardiac problems is indicated in the upper left-hand corner; the cardiac work-up and treatment are only described qualitatively. The dashed line leading from exercise testing back to the cardiac work-up is for patients with a negative cardiac history and a normal ECG, who show symptoms or signs of ischaemia during exercise testing. TI: thallium; Tc: technetium; $V'_{O_2,max}$: maximal oxygen uptake on exercise; ppo: predicted postoperative; ECG: electrocardiograph; FEV_1: forced expiratory volume in one second; $T_{L,CO}$: transfer factor of the lung for carbon monoxide.

ERJ 1998

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Poumons

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Functional and postoperative outcomes after preoperative exercise training in patients with lung cancer: a systematic review and meta-analysis

Raquel Sebio Garcia[a,*], Maria Isabel Yáñez Brage[b], Esther Giménez Moolhuyzen[c], Catherine L. Granger[d] and Linda Denehy[d]

Table 2: Description of interventions included in the studies

Study	Setting	Timing	Type of intervention: AT	ST	BE	IMT	Other[a]	Intensity	Duration of session (AT)	Frequency	Length of intervention	Adherence
Sekine *et al.* [31]	Supervised + unsupervised	Pre- + postoperative		–		–	–	NR	45′ (30′)	Everyday	2 weeks	NR
Jones *et al.* [32], Peddle *et al.* [34] and Jones *et al.* [35]	Supervised	Preoperative		–	–	–	–	Continuous and interval: 60–100% of VO^a_{2peak}	20–30′	5/week	4–10 weeks	72, 88 and 78%, respectively
Cesareo *et al.* [33]	Supervised	Preoperative		–		–		80% Wmax	3 h (NR)	5/week	4 weeks	NR
Bobbio *et al.* [14]	Supervised + unsupervised	Preoperative				–		50–80% of WMax	90′ (40′)	5/week	4 weeks	80%
Pehlivan *et al.* [36]	Supervised	Pre- + postoperative		–		–	–	%maxHR (Karvonen formula)	NR	3/day	1 week	NR
Benzo *et al.* [12] (Study 2)	Supervised + unsupervised	Preoperative					–	Borg scale	NR (20′)	5/week	2 weeks (10 sessions)	100%
Harada *et al.* [37]	Supervised	Preoperative		–		–		Borg scale	NR	CHPR: 2/week CVPR: 1/week	2–5 weeks	NR
Bagan *et al.* [38]	Supervised	Pre- + postoperative				–		Continuous: 20–30 weeks	NR (30′)	Daily	2 weeks	NR
Stefanelli *et al.* [43]	Supervised	Preoperative		–		–	–	Continuous: at least 70% Wmax	3 h (30)	5/week	3 weeks	NR
Fang *et al.* [40]	Supervised	Preoperative		–		–	–	Interval: 60–80% Wmax	NR (40′)	5/week	2 weeks	NR
Divisi *et al.* [41]	Supervised	Preoperative		–			–	Incremental up to 100% of Wmax	90′ (40′)	6/week	4–6 weeks	NR
Morano *et al.* [29] and Morano *et al.* [44]	Supervised	Preoperative			–			80% Wmax	NR (30′)	5/week	4 weeks	NR
Bradley *et al.* [28]	Supervised	Pre- and postoperative				–	–	Up to 60% Wmax	60′ (NR)	2/week	Variable	NR
Coats *et al.* [42]	Home-based	Preoperative			–	–	–	Continuous (60–80% Wmax)	NR (30′)	3–5/week	4 weeks	75%
Li *et al.* [43]	Supervised	Preoperative	–			–		NR	NR	NR	NR	NR
Mujovic *et al.* [45]	Supervised	Preoperative	–			–		NR	45′ (NA)	3/day; 5/week	2–4 weeks	NR
Gao *et al.* [46]	Supervised	Preoperative		–		–	–	Borg scale (5–7)	1.5–2 h (30–40′)	2/day	3–7 days	NR
Tarumi *et al.* [47]	Supervised (in-patient)	Pre- and postoperative		–		–		?	NR (45′)	5/week	10 weeks	NR

AT: aerobic training; ST: strength training; BE: breathing exercises; NR: not reported; CHPR: comprehensive preoperative pulmonary rehabilitation; CVPR: conventional preoperative pulmonary rehabilitation; VO_{2peak}: oxygen consumption peak; Wmax: maximal workload; maxHR: maximal heart rate; IMT: inspiratory muscle training; COPD: chronic obstructive pulmonary disease; PF: pulmonary function; PEF: peak expiratory flow; PR: pulmonary rehabilitation; CPT: conventional physical therapy.

[a]Education, relaxation, stretching and/or nutritional support.

Interact CV& thoracic surgery 2016

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Poumons

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Functional and postoperative outcomes after preoperative exercise training in patients with lung cancer: a systematic review and meta-analysis

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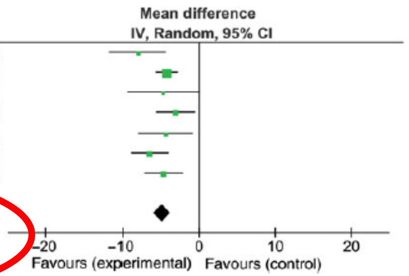
Catherine L. Granger[d] and Linda Denehy[d]

Study or subgroup	Rehabilitation Mean	SD	Total	Control Mean	SD	Total	Weight	Mean difference IV, Random, 95% CI	Year
Sekine et al., 2005	21	6.8	22	29	9	60	7.9%	−8.00 [−11.64, −4.36]	2005
Pehlivan et al., 2011	5.4	2.67	30	9.66	3.09	30	33.8%	−4.26 [−5.72, −2.80]	2011
Benzo et al., 2011	6.3	3	9	11	6.3	8	4.8%	−4.70 [−9.49, 0.09]	2011
Fang et al., 2013	11.8	3.23	22	14.9	5.16	22	14.9%	−3.10 [−5.64, −0.56]	2013
Morano et al., 2013	7.8	4.8	12	12.2	3.6	9	8.1%	−4.40 [−7.99, −0.81]	2013
Bradley et al., 2013	9.25	6.53	58	15.75	15.97	305	15.7%	−6.50 [−8.96, −4.04]	2013
Gao et al., 2014	14.54	4.71	71	19.21	9.89	71	[illegible]	[illegible]	2014
Total (95% CI)			224			505	100.0%	−4.83 [−5.90, -3.76]	

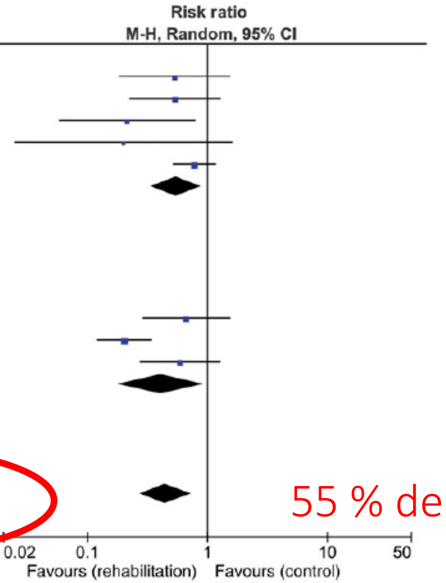
Heterogeneity: $\tau^2 = 0.33$; $\chi^2 = 7.10$, df = 6 ($P = 0.31$); $I^2 = 15\%$
Test for overall effect: $Z = 8.83$ ($P < 0.00001$)



5 jours H en moins !

Figure 3: Meta-analysis and pooled estimated effect size for postoperative length of stay in the intervention and control group. 95% CI: 95% confidence interval; SD: standard deviation.

Study or subgroup	Rehabilitation Events	Total	Control Events	Total	Weight	Risk ratio M-H, Random, 95% CI
1.4.1 Only PPC						
Benzo et al., 2011	3	9	5	8	10.7%	0.53 [0.18, 1.55]
Bradley et al., 2013	5	58	49	305	12.8%	0.54 [0.22, 1.29]
Morano et al., 2013	2	12	7	9	8.5%	0.21 [0.06, 0.80]
Pehlivan et al., 2011	1	30	5	30	4.4%	0.20 [0.02, 1.61]
Sekine et al., 2005	12	22	42	60	18.9%	0.78 [0.51, 1.18]
Subtotal (95% CI)		**131**		**412**	**55.2%**	**0.55 [0.34, 0.89]**
Total events	23		108			
Heterogeneity: $\tau^2 = 0.08$; $\chi^2 = 5.47$, df = 4 ($P = 0.24$); $I^2 = 27\%$						
Test for overall effect: $Z = 2.46$ ($P = 0.01$)						
1.4.2 All complications						
Fang et al., 2013	6	22	9	22	13.2%	0.67 [0.29, 1.56]
Gao et al., 2014	12	71	59	71	17.5%	0.20 [0.12, 0.34]
Harada et al., 2013	6	21	14	29	14.1%	0.59 [0.27, 1.28]
Subtotal (95% CI)		**114**		**122**	**44.8%**	**0.41 [0.18, 0.94]**
Total events	24		82			
Heterogeneity: $\tau^2 = 0.40$; $\chi^2 = 8.24$, df = 2 ($P = 0.02$); $I^2 = 76\%$						
Test for overall effect: $Z = 2.10$ ($P = 0.04$)						
Total (95% CI)		**245**		**534**	**100.0%**	**0.45 [0.28, 0.73]**
Total events	47		190			
Heterogeneity: $\tau^2 = 0.28$; $\chi^2 = 19.89$, df = 7 ($P = 0.006$); $I^2 = 65\%$						
Test for overall effect: $Z = 3.22$ ($P = 0.001$)						
Test for subgroup differences: $\tau^2 = 0.35$, df = 1 ($P = 0.55$), $I^2 = 0\%$						



55 % de complications en moins !

Figure 4: Subgroup analysis for postoperative complications (pulmonary versus all complications). 95% CI: 95% confidence interval; SD: standard deviation; STD: standardized; PPCs: postoperative pulmonary complications.

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Oesophage

INSTITUT JULES BORDET INSTITUUT · Hôpital Erasme · ULB · Hôpital Universitaire des Enfants Reine Fabiola / Universitair Kinderziekenhuis Koningin Fabiola

The Impact of Prehabilitation on Post-operative Outcomes in Oesophageal Cancer Surgery: a Propensity Score Matched Comparison

Laura J. Halliday[1] · Emre Doganay[1] · Venetia A. Wynter-Blyth[2] · George B. Hanna[1] · Krishna Moorthy[1]

Table 2 Comparison of study outcomes in both unmatched and propensity score matched analysis

	Unmatched groups			Matched groups		
	PREPARE	Controls	*p* value	PREPARE	Controls	*p* value
Any complication, *n* (%)	46 (68%)	31 (79%)	0.089	24 (63%)	31 (82%)	0.073
Pulmonary complication, *n* (%)	26 (36%)	26 (67%)	0.002	12 (32%)	26 (68%)	0.001
Post-operative pneumonia, *n* (%)	24 (33%)	25 (64%)	0.002	10 (26%)	25 (66%)	0.001
Severe complications, *n* (%)a	17 (24%)	18 (46%)	0.015	12 (32%)	18 (47%)	0.159
Length of stay (days), median (IQR)	10 (8–17)	13 (11–20)	0.019	10 (8–17)	13 (11–20)	0.018
30-day readmission, *n* (%)	13 (18%)	3 (8%)	0.138	9 (24%)	3 (8%)	0.059
Enhanced recovery protocol compliance						
Mobilisation, *n* (%)	24 (33%)	14 (36%)	0.679	11 (29%)	13 (34%)	0.449
NGT removal, *n* (%)	40 (56%)	13 (33%)	0.053	23 (61%)	13 (34%)	0.046
Drain removal, *n* (%)	34 (47%)	11 (28%)	0.048	16 (42%)	11 (29%)	0.179
Oral intake, *n* (%)	28 (39%)	12 (31%)	0.442	15 (39%)	12 (32%)	0.583
Fluid balance, *n* (%)	3 (4%)	4 (10%)	0.203	1 (3%)	4 (11%)	0.144
Pain control, *n* (%)	41 (57%)	23 (59%)	0.656	21 (55%)	23 (61%)	0.362
Day 0 extubation, *n* (%)	51 (71%)	28 (72%)	0.905	27 (71%)	27 (71%)	> 0.999

[a] Severe complications was defined as Clavien Dindo grade 3 or higher

IQR, inter quartile range; *NGT*, nasogastric tube

30à50 % de complications en moins !

3 jours H en moins !

J. of Gastrointestinal Surg 2021

Colo-rectal

Prehabilitation in colorectal cancer surgery improves outcome and reduces hospital costs

Charissa R. Sabajo [a,b], David W.G. ten Cate [a], Margot H.M. Heijmans [a], Christian T.G. Koot [c], Lisanne V.L. van Leeuwen [d], Gerrit D. Slooter [a,*]

Introduction: Increasing evidence suggests that multimodal prehabilitation programs reduce postoperative complication rates and length of stay. Nevertheless, prehabilitation is not standard care yet, also as financial consequences of such programs are lacking. Aim of this study was to analyse clinical outcomes and effects on hospital resources if prehabilitation is implemented for patients who are planned for colorectal surgery.

Materials and methods: Patients undergoing elective colorectal surgery and who received either prehabilitation or standard care between January 2017 and March 2022 in a regional Dutch hospital were included. Outcome parameters were length of hospital stay, 30-day postoperative complications, 30-day ICU admission, readmission rates and hospital costs.

Results: A total of 196 patients completed prehabilitation whereas 390 patients received standard care. Lower overall complication rates (31 % vs 40 %, p = 0.04) and severe complication rates (20 % vs 31 %, p = 0.01) were observed in the prehabilitation group compared to standard care. Length of stay was shorter in the prehabilitation group (mean 5.80 days vs 6.71 days). In hospital cost savings were €1109 per patient, while the calculated investment for prehabilitation was €969.

Conclusion: Implementation of a multimodal prehabilitation program in colorectal surgery reduces postoperative complication rates, length of stay and hospital costs.

2.2. Prehabilitation program

A four-week program with the following interventions was offered [5].

- Supervised high-intensity physical training focussing on strength and endurance three times per week, provided by physical therapists in-hospital or in first-line physical therapy practices. All physical therapists followed a standardized training.
- Nutritional assessment and intervention with supplementation of protein and vitamin that was provided by an in-hospital dietitian.
- A 4-week smoking cessation intervention when indicated, provided by an external organization.
- Psychological support and optimal patient information, provided by a nurse-specialist.

Eur J of surgical oncology 2024

« Tête et cou »

Pre-rehabilitation interventions for patients with head and neck cancers: A systematic review and meta-analysis

Ishith Seth, Gabriella Bulloch, Kirby R Qin, Yi Xie, Benjamin Sebastian, Hann Liew, Warren Matthew Rozen, Chun Hin Angus Lee Head Neck. 2023 Oct 28

Objective: To investigate the effect of pre-rehabilitation interventions such as nutrition and exercise for patients with head and neck cancer (HNC).
Methods: Web of Science, PubMed, Scopus, Google Scholar, and Cochrane databases were searched up to December 2022. Quality of life, length of hospital stay, postoperative complications, change in body mass index or muscle mass, and functional assessments were the primary outcomes. PRISMA guidelines were adhered to, and the study was registered on PROSPERO. The Cochrane Collaboration tool and Newcastle Ottawa scale assessed the quality of included studies. Pooled data are presented as odds ratios (OR) and 95% confidence intervals (CI). Analysis was conducted using RevMan5.4.
Results: A total of 31 articles were included for quantitative analysis and 15 for qualitative synthesis. Nutrition alone resulted in significant weight retention (2.60; 2.32, 2.88, $p < 0.00001$), length of stay (-4.00; -6.87, -1.13), $p = 0.0006$) and complications (0.64; 0.49, 0.83, $p = 0.0009$). Nutrition and psychoeducation resulted in a significant reduction in mortality rate (0.70; 0.49, 1.00, $p = 0.05$ and 0.60; 0.48, 0.74, $p < 0.00001$), and exercise resulted in a significant reduction in dysphagia (0.55; 0.35, 0.87, $p = 0.01$). Exercise with nutrition resulted in significant improvements in weight loss, length of stay, complications, and dysphagia. Randomized controlled trials (RCTs) had a moderate risk of bias and cohort studies were of fair to good quality.

Conclusion: **Prehabilitation programs based on exercise, nutrition, or psychoeducation demonstrated improved post-interventional outcomes in HNC, such as quality of life, and mortality and morbidity**. Studies with longer follow-ups and larger sample sizes, and investigations comparing nutritional supplements with exercise programs are needed.

Prostate

Prehabilitative versus rehabilitative exercise in prostate cancer patients undergoing prostatectomy

Favil Singh[1,2] · Robert U. Newton[1,2,3] · Dennis R. Taaffe[1,2] · Pedro Lopez[1,2,4] · Jeff Thavaseelan[5] · Matthew Brown[5,6,7] · Elayne Ooi[8] · Kazunori Nosaka[1,2] · Dickon Hayne[6,7] · Daniel A. Galvão[1,2]

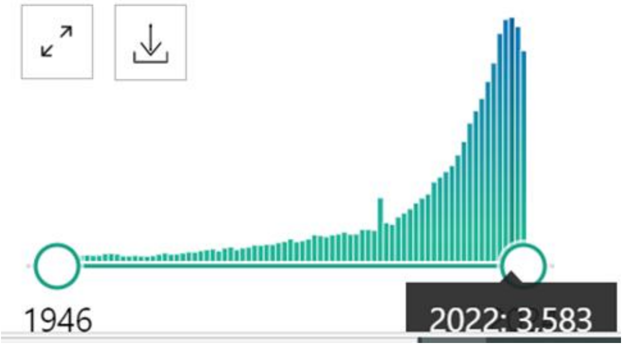
Purpose The study compared the efficacy of commencing supervised exercise in men with prostate cancer before and after prostatectomy on objective and patient-reported outcomes, hospital length of stay, and urinary incontinence.

Methods Forty-one men were randomised to a 6-week prehabilitation or rehabilitation exercise programme. Prehabilitation involved resistance and aerobic exercise thrice weekly pre-surgery, while rehabilitation comprised the same commencing 6-weeks post-surgery. Assessments included strength, function (chair rise, stair climb, 400-m, 6-m usual, fast, and backwards walk), body composition, fatigue and quality of life, undertaken at pre-surgery, early post-surgery and late post-surgery phase, with urinary incontinence (24-h pad test) assessed at 2, 6, and 12-weeks post-surgery. Intention-to-treat and sensitivity analyses were undertaken.

Results Of thirty-eight men (48–73 years), 29 completed all assessments with most undergoing robotic-assisted laparoscopic prostatectomy (92.1%). In the pre-surgery phase, prehabilitation improved muscle strength (leg press: 17.2 kg; chest press: 2.9 kg; $p \leq 0.001$), 400-m, chair rise, 6-m fast and backward walk tests ($p \leq 0.001$–0.028). Strength and function declines in the early post-surgery phase were maintained late post-surgery. Rehabilitation showed declines of these outcomes after surgery with improvement late post-surgery (leg press: 14.6 kg, $p < 0.001$; chest press: 6.8 kg, $p < 0.001$; 400-m walk: -12.0 s, $p = 0.005$), resulting in no difference between groups at 12 weeks. There were no significant differences between groups for patient-reported outcomes, hospital length of stay or urinary incontinence.

Conclusion Pre-surgical exercise enhanced strength and function, protecting against post-surgery declines. Although exercise post-surgery is beneficial for recouping strength and function, where possible men undergoing prostatectomy are encouraged to exercise pre-surgery.

J of Cancer research and clin oncol 2023



Onco-réadaptation
Pdt les traitements

Effects of supervised exercise on cancer-related fatigue in breast cancer survivors: a systematic review and meta-analysis

José Francisco Meneses-Echávez[1*], Emilio González-Jiménez[2] and Robinson Ramírez-Vélez[1]

Abstract

Background: Cancer-related fatigue (CRF) is the most common and distressing symptom in breast cancer survivors. Approximately 40% to 80% of cancer patients undergoing active treatment suffer from CRF. Exercise improves overall quality of life and CRF; however, the specific effects of the training modalities are not well understood.

Methods: This study aimed to determine the pooled effects of supervised exercise interventions on CRF in breast cancer survivors. We searched PubMed/MEDLINE, EMBASE, Scopus, CENTRAL and CINAHL databases between December 2013 and January 2014 without language restrictions. Risk of bias and methodological quality were evaluated using the PEDro score. Pooled effects were calculated with a random-effects model according to the DerSimonian and Laird method. Heterogeneity was evaluated with the I^2 test.

Results: Nine high-quality studies (*n* = 1156) were finally included. Supervised aerobic exercise was statistically more effective than conventional care in improving CRF among breast cancer survivors (SMD = –0.51, 95%CI –0.81 to –0.21), with high statistical heterogeneity ($P = 0.001$; $I^2 = 75\%$). Similar effects were found for resistance training on CRF (SMD = –0.41, 95%CI –0.76 to –0.05; $P = 0.02$; $I^2 = 64\%$). Meta-regression analysis revealed that exercise volume parameters are closely related with the effect estimates on CRF. Egger's test suggested moderate evidence of publication bias ($P = 0.04$).

Conclusions: Supervised exercise reduces CRF and must be implemented in breast cancer rehabilitation settings. High-volume exercises are safe and effective in improving CRF and overall quality of life in women with breast cancer. Further research is encouraged.

Trial Registration: CRD42014007223

Keywords: Breast Neoplasms, Exercise, Resistance training, Rehabilitation, Medical oncology

CRF

BMC Cancer 2015

Cancer et exercices

Study name	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Campbell et al. 2005	-0.776	0.476	0.227	-1.710	0.158	-1.629	0.103
Cantarero et al. 2013	-0.468	0.260	0.068	-0.978	0.041	-1.802	0.072
Courneya et al. 2003	-0.912	0.292	0.085	-1.484	-0.339	-3.120	0.002
Ergun et al. 2013	-0.158	0.317	0.100	-0.779	0.462	-0.500	0.617
Milne et al. 2008	-1.169	0.284	0.081	-1.726	-0.612	4.114	0.000
Mutrie et al. 2007	-0.071	0.152	0.023	-0.368	0.227	-0.465	0.642
Saarto et al. 2012	-0.148	0.090	0.008	-0.324	0.028	-1.651	0.099
Segal et al. 2001	-1.273	0.297	0.089	-1.856	-0.690	-4.279	0.000
Winters et al. 2012	-0.123	0.245	0.060	-0.603	0.358	-0.500	0.617
	-0.511	0.151	0.023	-0.807	-0.215	-3.386	0.001

Std diff in means and 95%CI

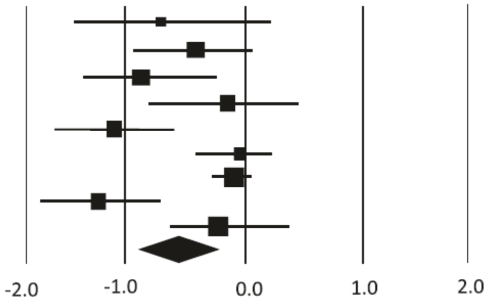
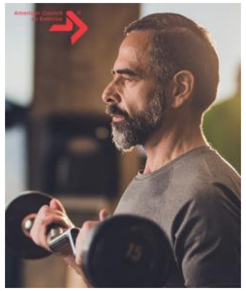


Figure 2 Metaanalysis for the effect estimate of supervised exercise on CRF in Breast cancer survivors. Standardized mean difference (SMD) was calculated for the Random effects model of metaanalysis. IV, inverse of variance; CI, confidence interval.

CRF



Study name	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Campbell et al. 2005	-0.776	0.476	0.227	-1.710	0.158	-1.629	0.103
Cantarero et al. 2013	-0.468	0.260	0.068	-0.978	0.041	-1.802	0.072
Ergun et al. 2013	-0.158	0.317	0.100	-0.779	0.462	-0.500	0.617
Milne et al. 2008	-1.169	0.284	0.081	-1.726	-0.612	4.114	0.000
Mutrie et al. 2007	-0.071	0.152	0.023	-0.368	0.227	-0.465	0.642
Winters et al. 2012	-0.123	0.245	0.060	-0.603	0.358	-0.500	0.617
	-0.410	0.180	0.032	-0.763	-0.058	-2.281	0.023

Std diff in means and 95%CI

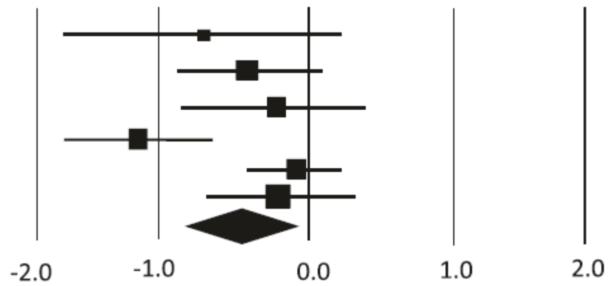


Figure 3 Metaanalysis for the effect estimate of supervised resistance training on CRF in Breast cancer survivors. Standardized mean difference was (SMD) calculated for the Random effects model of metaanalysis. IV, inverse of variance; CI, confidence interval.

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Stage of treatment	Study name	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Active	Campbell et al. 2005	-0.776	0.476	0.227	-1.710	0.158	-1.629	0.103
Active	Courneya et al. 2003	-0.912	0.292	0.085	-1.484	-0.339	-3.120	0.002
Active	Milne et al. 2008	-1.169	0.284	0.081	-1.726	-0.612	4.114	0.000
Active	Mutrie et al. 2007	-0.071	0.152	0.023	-0.368	0.227	-0.465	0.642
Active	Saarto et al. 2012	-0.148	0.090	0.008	-0.324	0.028	-1.651	0.099
Active	Segal et al. 2001	-1.273	0.297	0.089	-1.856	-0.690	-4.279	0.000
Active		-0.662	0.216	0.047	-1.086	-0.238	-3.059	0.002
After	Cantarero et al. 2013	-0.468	0.260	0.068	-0.978	0.041	-1.802	0.072
After	Ergun et al. 2013	-0.158	0.317	0.100	-0.779	0.462	-0.500	0.617
After	Winters et al. 2012	-0.123	0.245	0.060	-0.603	0.358	-0.500	0.617
After		-0.255	0.155	0.024	-0.559	0.050	-1.640	0.101

Std diff in means and 95%CI

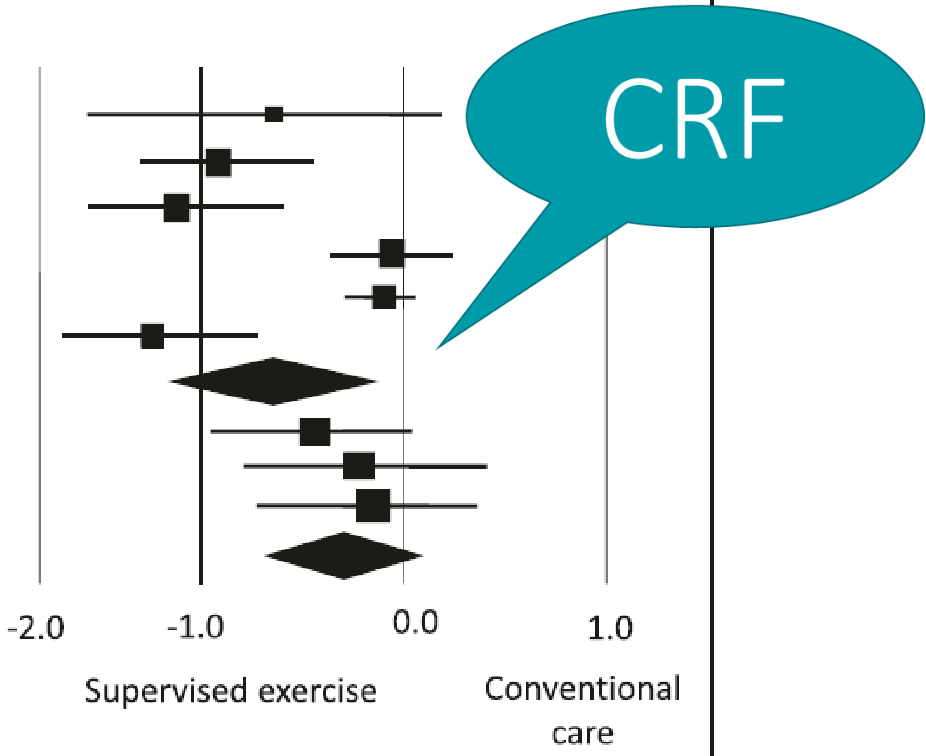


Figure 5 Metaanalysis for the effect estimate of supervised resistance training on CRF in Breast cancer survivors according to the anti-cancer treatment stage. Standardized mean difference was (SMD) calculated for the Random effects model of metaanalysis. IV, inverse of variance; CI, confidence interval.

Effects of Exercise on Chemotherapy Completion and Hospitalization Rates: The OptiTrain Breast Cancer Trial

SARA MIJWEL,[a] KATE A. BOLAM,[a] JACOB GERREVALL,[b] THEODOROS FOUKAKIS,[c,d] YVONNE WENGSTRÖM,[a,d] HELENE RUNDQVI

240 femmes, néo sein

Pendant la chimio

- Gr RT+HIIT
- Gr AT+HIIT
- Gr usual care

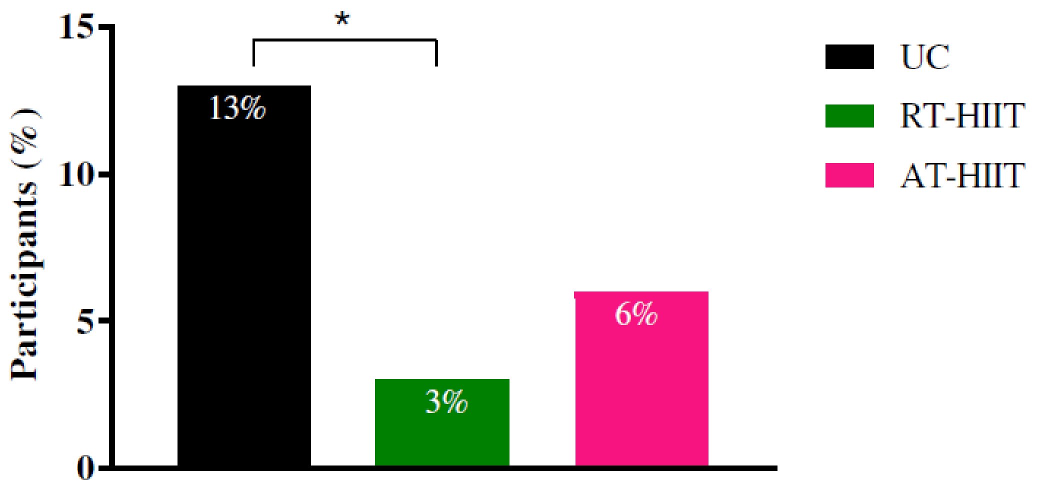
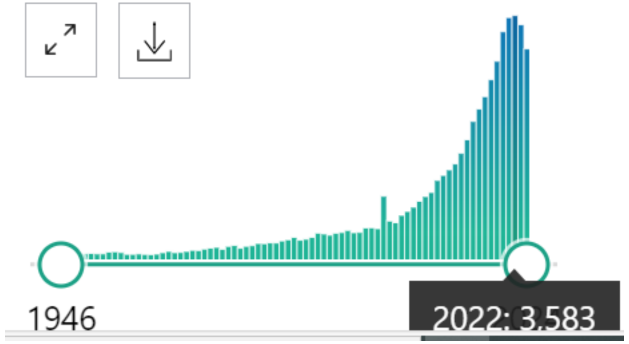


Figure 3. Percentage of each group being hospitalized in the RT-HIIT, AT-HIIT, and UC groups. * indicates $p < .05$ between groups. Abbreviations: AT-HIIT, moderate-intensity aerobic and high-intensity interval training; RT-HIIT, resistance and high-intensity interval training; UC, usual care.

+ effets détaillés sur la force, le BMI, la douleur, la fatigue, la QdV

The oncologist 2018



Onco-réadaptation

Post traitement

Constats

- 1 an post traitement :
  - 78 % des patients sont fatigués,
  - 42 % faibles
  - 76 % incapables de pratiquer des activités physiques

- France 2012 (VICAN2&5):
  - Sur 4349 P (ts cancer) : parmi ceux qui avaient une activité physique avant :
  - 6/10 l'ont modifié (4 pour la réduire, 1 pour la stopper, 1 pour l'augmenter) (à 2 ans) (idem à 5 ans)

  - 5 ans après le diagnostic, 48,7 % des personnes décrivent la fatigue comme un symptôme cliniquement significatif et 44,4 % disent avoir une qualité de vie dégradée

  - Sur 8/10 qui travaillaient au moment du diagnostic, 6/10 travaillent 2 ans plus tard

« C'est quoi le problème ? »

« Principales difficultés rencontrées au cours du dernier mois »

	Fréquence	
	n	%
Chimiothérapie	162	95
Mobilité	355	88
Détresse psychologique	319	84
Radiothérapie	54	84
Dysfonctions sexuelles	157	73
Anxiété médicale	271	71
Douleurs	237	62
Intérêt sexuel	190	51
Adhésion aux traitement	37	49
Communication conjugale	120	40

Dia originale : I. Meerckaert

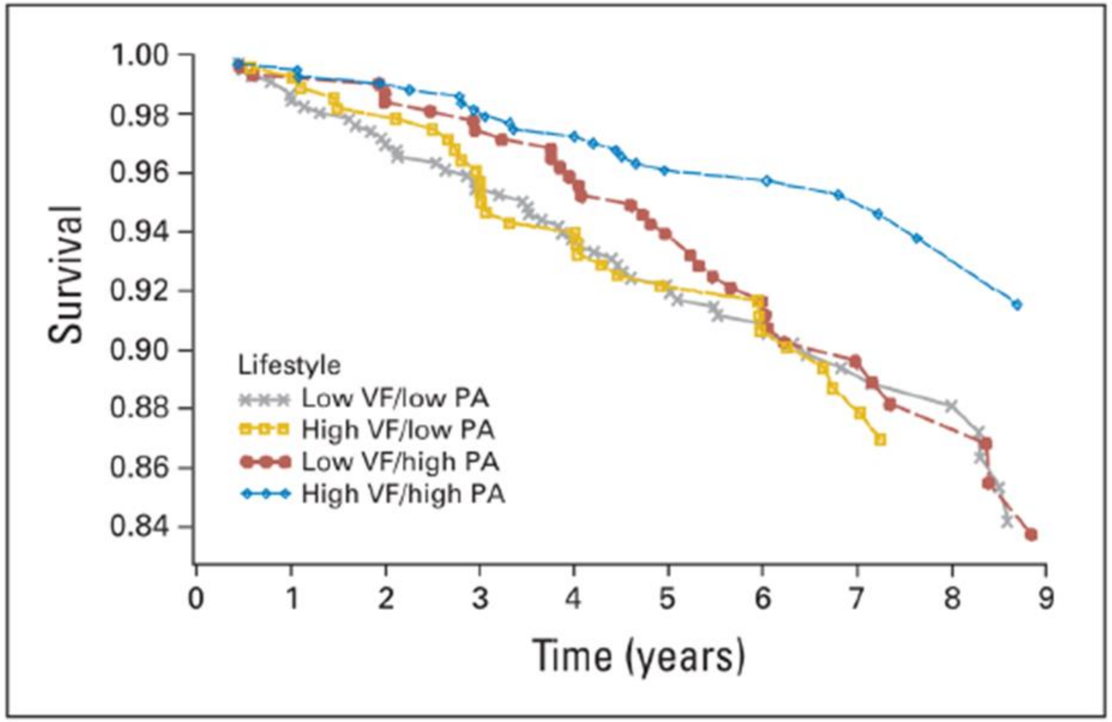
Sein : WHEL study (2361 femmes)

Manger plus de 5 rations quotidiennes de fruits et légumes par jour

et

Faire au moins 30 minutes de marche soutenue par jour   6 j / semaine

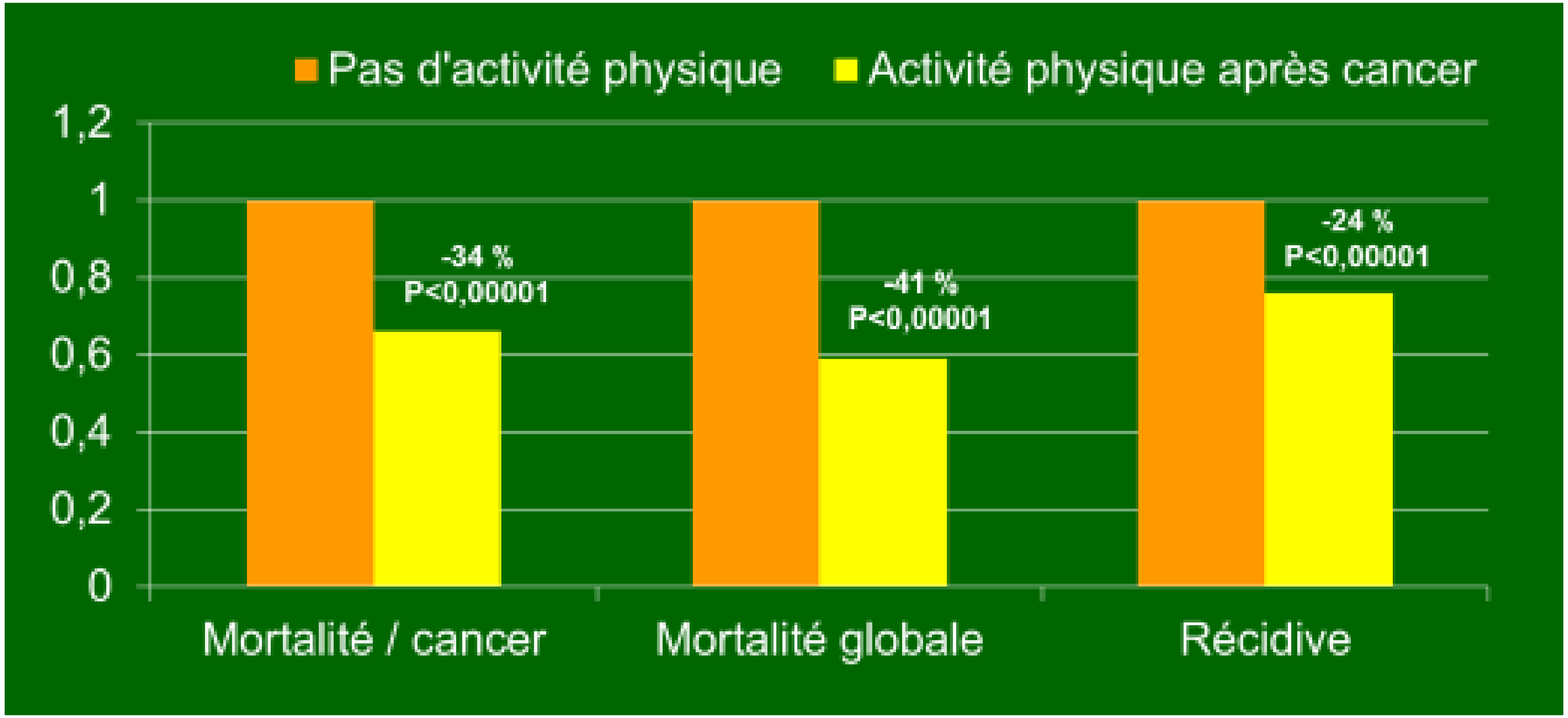
→ Effet sur la mortalité ?



Pierce 2007, Bertram 2011

Physical activity and survival after breast cancer diagnosis: meta-analysis of published studies

Ezzeldin M. Ibrahim · Abdelaziz Al-Homaidh



12108 patients / 6 études

Med Oncol 2011

Colon : NURSES' HEALTH STUDY (NHS)

- 121 700 femmes, questionnaire tous les 2 ans
- 573 cancers coliques stades I à III
- 132 décès dont 80 par cancer colique

MET / H /SEM	<3	3-7.9	8-17.9	>18	
Cancer specific mortality	1	0.92 0.50-1.69	0.57 0.27-1.20	0.39 0.18-0.82	P = 0.008
Overall survival	1	0.77 0.48-1.23	0.50 0.28-0.90	0.43 0.25-0.74	P = 0.003

JCO 2006

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Physical Activity and Survival After Prostate Cancer Diagnosis in the Health Professionals Follow-Up Study

Stacey A. Kenfield, Meir J. Stampfer, Edward Giovannucci, and June M. Chan

Table 3. Age- and Multivariable-Adjusted HRs According to Physical Activity Category After Prostate Cancer Diagnosis

Measure	Total Activity: < 3 MET-h/wk	3 to < 9 MET-h/wk	9 to < 24 MET-h/wk	24 to < 48 MET-h/wk	≥ 48 MET-h/wk	P for Trend
Median MET-hours per week on first postdiagnosis questionnaire	0.6	5.7	16	33.4	71.0	
All deaths (n = 548)						
No. of deaths	125	99	143	116	65	
Age-adjusted HR	1.00	0.79	0.63	0.57	0.33	< .001
95% CI		0.60 to 1.04	0.49 to 0.80	0.44 to 0.73	0.24 to 0.45	
Multivariable-adjusted HR*	1.00	0.81	0.70	0.66	0.40	< .001
95% CI		0.61 to 1.07	0.54 to 0.90	0.51 to 0.87	0.29 to 0.54	
Multivariable-adjusted HR†	1.00	0.80	0.69	0.65	0.38	< .001
95% CI		0.61 to 1.06	0.53 to 0.90	0.49 to 0.86	0.27 to 0.53	
Prostate cancer deaths (n = 112)						
No. of prostate cancer deaths	21	21	25	30	15	
Age-adjusted HR	1.00	0.90	0.61	0.85	0.41	.02
95% CI		0.49 to 1.67	0.34 to 1.10	0.48 to 1.50	0.21 to 0.80	
Multivariable-adjusted HR‡	1.00	0.96	0.65	0.93	0.46	.04
95% CI		0.51 to 1.80	0.36 to 1.20	0.51 to 1.68	0.23 to 0.92	
Multivariable-adjusted HR§	1.00	0.91	0.60	0.83	0.42	.04
95% CI		0.48 to 1.73	0.32 to 1.11	0.44 to 1.55	0.20 to 0.88	

NOTE. Physical activity was updated over follow-up. Men were alive for at least 4 years after their postdiagnosis physical activity assessments, and we only used activity information from 4 to 6 years before death.

Abbreviations: HR, hazard ratio; MET, metabolic equivalent task.

*Adjusted for age at diagnosis, months since diagnosis, clinical stage, Gleason score, treatment, parental history of myocardial infarction at age 60 years or younger, high blood pressure, elevated cholesterol, and diabetes status from the prediagnostic questionnaire; smoking status, body mass index, and alcohol intake from the first postdiagnostic questionnaire; and comorbidities (coded as yes if participant reported any of the following: myocardial infarction, coronary artery bypass or coronary angioplasty, stroke, Parkinson's disease, and emphysema or chronic bronchitis). This variable was updated over follow-up, and comorbidity status was applied one cycle prior to physical activity exposure.

†Additionally adjusted for prediagnosis physical activity.

‡Adjusted for age at diagnosis, months since diagnosis, clinical stage, Gleason score, treatment, and postdiagnosis body mass index.

§Additionally adjusted for prediagnosis physical activity.

JCO 2011

Modalités ?

The benefits of exercise in cancer patients and the criteria for exercise prescription in cardio-oncology

Flavio D'Ascenzi[1,2], Francesca Anselmi[1], Caterina Fiorentini[1], Roberta Mannucci[3], Marco Bonifazi[4] and Sergio Mondillo[1]

Table 1. Key recommendations for exercise prescription in cancer patients.

General principles

The time must be adapted to the individual's situation, age and previous experience of physical activity and exercise.

When patients are not able to meet the following key guidelines, they should engage in regular physical exercise according to their abilities and should avoid inactivity.

Cancer patients can have absolute or relative contraindications to exercise: see text for details.

Exercise dose is determined by: (a) frequency; (b) duration; (c) intensity.

Frequency and duration

- From 150–300 min per week of moderate intensity.
- Or from 75–150 min per week of vigorous intensity aerobic physical activity.
- Or an equivalent combination of both.
- Muscle-strengthening activities of moderate or greater intensity and that involve all major muscle groups on 2 or more days per week.
- Flexibility training should be performed at least 2–3 times per week, such as stretching (10–20 s), four times per muscle group.
- Respiratory muscle training should be performed three times per week, with a duration of 30–60 min.

Intensity

- Moderate endurance training: Borg Scale 12–14; 50–70% peak V_{O2}; BL 2–4 mmol/l[a]; 60–80% maximum heart rate.
- Vigorous endurance training: Borg Scale > 14; 60–80% peak V_{O2}; BL 3–5 mmol/l[a]; 70–90% maximum heart rate.
- Resistance training: intensity should correspond to 50–70% of 1 RM.
- Respiratory muscle training: 30% of maximum inspiratory pressure.

According to the literature currently available, moderate exercise should correspond to an intensity slightly above the 1st ventilatory threshold or LT while vigorous exercise should correspond to an intensity slightly below the 2nd ventilatory threshold. The corresponding percentages of maximum heart rate and peak V_{O2} can be individually determined. As a consequence, the range of intensity of training can significantly change according to training and clinical status.

Progression

Frequency: start with a weekly session and introduce the second session when the patient is adapted (2–3 times per week is considered the optimal frequency).

Duration: start with 10–30 min of endurance training and increase of 10 min every week to reach the optimal weekly training volume in 3–4 weeks.

Intensity: During the first 3–4 weeks, starting with a lower intensity, then progress with the suggested intensity. The progression should take into account patient's adaptation to exercise, previous experience of training, age and clinical conditions.

The patient should start gradually with 1–3 sets of 8–10 resistance exercise, increasing weekly training volume according to his/her adaptation.

Specific principles

Select the appropriate exercise from multiple-joint basic exercises for major large muscle (chest press, shoulder press, squat, abdominal crunch...).

Introduce progressively single-joint basic exercise in each session after multiple-joint exercises (biceps curl, triceps extension, leg extension...).

Rotation of exercises (upper and lower body and opposing agonist-antagonist).

To have more effect in counteracting protein catabolism: start training volume from one set to increase progressively to three sets (or more) of 8–12 repetitions. In this manner the last repetition is made with a perceived effort that discourages the next repetition.

Interval of rest between sets should be 1–2 min.

Velocity of execution should be slow-moderate. Duration of concentric phase of about 2 s; duration of eccentric phase: 2–4 s; duration of the set is at least 40 s.

Avoid Valsalva manoeuver during weight lifting.

BL: blood lactate; LT: lactate threshold; RM: repetition maximum.
One RM corresponds to the maximum weight that can be lifted through the entire exercise movement only one time. Maximum heart rate and peak V_{O2} are intended as the maximal values individually determined by stress testing. [a]Lactate level during moderate exercise is constant at 2–4 mmol/l while during vigorous exercise is constant or slightly increasing, usually between 3–5 mmol/l.

Eur J Prev Cardiol 2019

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INSTITUT JULES BORDET INSTITUUT · Hôpital Erasme · ULB · Hôpital Universitaire des Enfants Reine Fabiola

Cardio-Oncology Rehabilitation for Cancer Survivors With High Cardiovascular Risk
A Randomized Clinical Trial

Sofia Gonçalves Viamonte, MD; Ana Vieira Joaquim, MD; Alberto Jorge Alves, PhD; Eduardo Vilela, PhD; Andreia Capela, MD; Cristina Ferreira, MD; Barbara Fresco Duarte, MS; Nuno Dias Rato, MS; Madalena Pinheiro Teixeira, MD; Aida Tavares, PhD; Mário Santos, PhD; Fernando Ribeiro, PhD

CBCR (cardiac) versus CBET (spécialisé onco), randomisé 1:1, 8 semaines

IMPORTANCE Cardiovascular disease is a leading cause of morbidity in cancer survivors, which makes strategies aimed at mitigating cardiovascular risk a subject of major contemporary importance.

OBJECTIVE To assess whether a center-based cardiac rehabilitation (CBCR) framework compared with usual care encompassing community-based exercise training (CBET) is superior for cardiorespiratory fitness improvement and cardiovascular risk factor control among cancer survivors with high cardiovascular risk.

DESIGN, SETTING, AND PARTICIPANTS This prospective, single-center, randomized clinical trial (CORE trial) included adult cancer survivors who had exposure to cardiotoxic cancer treatment and/or previous cardiovascular disease. Enrollment took place from March 1, 2021, to March 31, 2022. End points were assessed at baseline and after the 8-week intervention.

INTERVENTIONS Participants were randomly assigned in a 1:1 ratio to 8 weeks of CBCR or CBET. The combined aerobic and resistance exercise sessions were performed twice a week.

MAIN OUTCOMES AND MEASURES The powered primary efficacy measure was change in peak oxygen consumption ($\dot{V}O_2$) at 2 months. Secondary outcomes included handgrip maximal strength, functional performance, blood pressure (BP), body composition, body mass index (BMI; calculated as weight in kilograms divided by height in meters squared), lipid profile, plasma biomarker levels, physical activity (PA) levels, psychological distress, quality of life (QOL), and health literacy.

RESULTS A total of 75 participants completed the study (mean [SD] age, 53.6 [12.3] years; 58 [77.3%] female), with 38 in the CBCR group and 37 in the CBET group. Participants in CBCR achieved a greater mean (SD) increase in peak $\dot{V}O_2$ than those in CBET (2.1 [2.8] mL/kg/min vs 0.8 [2.5] mL/kg/min), with a between-group mean difference of 1.3 mL/kg/min (95% CI, 0.1-2.6 mL/kg/min; $P = .03$). Compared with the CBET group, the CBCR group also attained a greater mean (SD) reduction in systolic BP (−12.3 [11.8] mm Hg vs −1.9 [12.9] mm Hg; $P < .001$), diastolic BP (−5.0 [5.7] mm Hg vs −0.5 [7.0] mm Hg; $P = .003$), and BMI (−1.2 [0.9] vs 0.2 [0.7]; $P < .001$) and greater mean (SD) improvements in PA levels (1035.2 [735.7] metabolic equivalents [METs]/min/wk vs 34.1 [424.4] METs/min/wk; $P < .001$), QOL (14.0 [10.0] points vs 0.4 [12.9] points; $P < .001$), and health literacy scores (2.7 [1.6] points vs 0.1 [1.4] points; $P < .001$). Exercise adherence was significantly higher in the CBCR group than in the CBET group (mean [SD] sessions completed, 90.3% [11.8%] vs 68.4% [22.1%]; $P < .001$).

CONCLUSION AND RELEVANCE The CORE trial showed that a cardio-oncology rehabilitation model among cancer survivors with high cardiovascular risk was associated with greater improvements in peak $\dot{V}O_2$ compared with usual care encompassing an exercise intervention in a community setting. The CBCR also showed superior results in exercise adherence, cardiovascular risk factor control, QOL, and health literacy.

JAMA Cardiol 2023

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CBCR (cardiac) versus CBET (spécialisé onco), randomisé 1:1, 8 semaines

Table 2. Body Composition, Handgrip Strength, and Physical Function Changes After the 8-Week Intervention

Metric	CBCR (n = 38) Mean (SD) Baseline	CBCR Postintervention	CBCR Change from baseline	CBCR P value	CBET (n = 37) Mean (SD) Baseline	CBET Postintervention	CBET Change from baseline	CBET P value	Between-group difference Mean (95% CI)	Between-group P value
Peak $\dot{V}O_2$, mL/kg/min	24.4 (7.0)	26.5 (7.5)	2.1 (2.8)	<.001	23.8 (6.2)	24.5 (6.0)	0.8 (2.5)	.07	1.3 (0.1 to 2.6)	.03
Exercise test duration, s	583.4 (141.6)	689.3 (142.9)	105.8 (64.0)	<.001	574.0 (175.5)	621.2 (156.6)	47.3 (64.2)	<.001	58.6 (28.9 to 88.3)	<.001
Weight, kg	75.0 (14.0)	72.1 (13.1)	−2.9 (2.6)	<.001	74.1 (14.8)	74.4 (14.6)	0.3 (1.6)	.22	−3.2 (−4.2 to −2.2)	<.001
BMI	27.7 (5.0)	26.6 (4.7)	−1.2 (0.9)	<.001	27.1 (4.7)	27.3 (4.7)	0.2 (0.7)	.10	−1.4 (−1.7 to −1.0)	<.001
Lean mass, kg	25.6 (4.0)	28.4 (5.5)	2.8 (2.5)	<.001	25.6 (5.4)	25.6 (5.5)	−0.1 (1.2)	.74	2.9 (2.0 to 3.8)	<.001
Fat mass, kg	27.8 (11.5)	25.0 (10.8)	−2.9 (2.3)	<.001	26.9 (10.5)	27.3 (10.7)	0.4 (2.3)	.24	−3.3 (−4.4 to −2.3)	<.001
Waist circumference, cm	99.2 (10.2)	94.4 (9.8)	−4.8 (3.3)	<.001	97.4 (11.2)	96.7 (11.4)	−0.7 (2.9)	.18	−4.1 (−5.6 to −2.7)	<.001
Hip circumference, cm	106.8 (12.1)	102.5 (10.8)	−4.3 (3.3)	<.001	103.8 (10.0)	103.9 (9.6)	0.1 (2.9)	.87	−4.4 (−5.8 to −3.0)	<.001
IHG, kgf										
Dominant hand	34.5 (7.2)	37.2 (7.2)	2.7 (2.4)	<.001	33.7 (9.7)	35.3 (8.5)	1.6 (3.4)	.01	1.0 (−0.3 to 2.4)	.13
Nondominant hand	31.6 (6.7)	33.7 (7.0)	2.1 (2.4)	<.001	31.6 (9.3)	33.3 (8.4)	1.6 (3.6)	.01	0.5 (−1.0 to 1.9)	.52
Sit-to-stand test, repetitions in 60 s, No.	32.0 (9.9)	42.7 (12.5)	10.7 (8.6)	<.001	30.9 (9.7)	32.9 (10.6)	2.0 (5.1)	.02	8.7 (5.5 to 12.0)	<.001

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); CBCR, center-based cardiac rehabilitation; CBET, community-based exercise treatment; IHG, isometric handgrip strength; kgf, kilogram-force; $\dot{V}O_2$, oxygen consumption.

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INSTITUT JULES BORDET INSTITUUT · Hôpital Erasme · ULB · Hôpital Universitaire des Enfants Reine Fabiola · Universitair Kinderziekenhuis Koningin Fabiola

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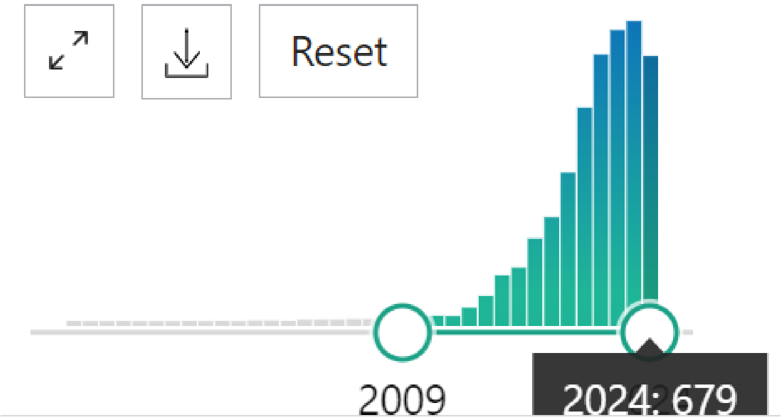
Table 3. Blood Pressure, Heart Rate, Physical Activity, Lipid Profile, Inflammatory Markers, Psychological Symptoms, Health Literacy, and Health-Related Quality-of-Life Changes After the 8-Week Intervention

	CBCR (n = 38)				CBET (n = 37)					
	Mean (SD)				Mean (SD)				Between-group difference	
Metric	Baseline	Postintervention	Change from baseline	P value	Baseline	Postintervention	Change from baseline	P value	Mean (95% CI)	P value
Resting SBP, mm Hg	127.1 (18.9)	114.8 (13.8)	−12.3 (11.8)	<.001	123.9 (20.2)	122.0 (14.7)	−1.9 (12.9)	.39	−10.4 (−16.1 to −4.7)	<.001
Resting DBP, mm Hg	81.5 (8.4)	76.5 (7.8)	−5.0 (5.7)	<.001	81.4 (11.0)	80.9 (8.7)	−0.5 (7.0)	.70	−4.5 (−7.5 to −1.6)	.003
Resting heart rate, bpm	81.2 (13.6)	75.3 (11.3)	−5.9 (6.5)	<.001	82.0 (13.3)	83.7 (12.3)	1.7 (8.2)	.22	−7.6 (−11.0 to −4.2)	<.001
Total cholesterol level, mg/dL	182.1 (36.9)	167.1 (26.3)	−15.0 (27.8)	.002	178.1 (33.1)	186.7 (33.4)	8.6 (32.6)	.12	−23.6 (−37.6 to −9.7)	.001
Triglyceride levels, mg/dL	125.2 (60.0)	93.0 (32.6)	−32.3 (40.4)	<.001	152.0 (105.6)	154.9 (113.9)	2.9 (68.0)	.80	−35.2 (−60.8 to −9.5)	.008
HDL cholesterol level, mg/dL	53.3 (12.9)	54.3 (10.5)	1.0 (7.4)	.41	53.2 (13.3)	52.6 (14.2)	−0.6 (7.5)	.60	1.6 (−1.8 to 5.1)	.34
LDL cholesterol level, mg/dL	107.0 (32.3)	92.8 (24.5)	−14.2 (29.4)	.005	101.0 (32.3)	105.1 (28.6)	4.2 (21.6)	.25	−18.3 (−30.2 to −6.5)	.003
IL-6 level, pg/mL	5.2 (6.2)	4.8 (5.7)	−0.5 (2.0)	.19	3.6 (5.1)	5.1 (5.5)	1.5 (5.5)	.15	−2.0 (−4.0 to 0.1)	.06
HSCRP level, mg/dL	0.35 (0.39)	0.26 (0.29)	−0.08 (0.39)	.18	0.29 (0.46)	0.41 (0.72)	0.12 (0.66)	.35	−0.2 (−0.5 to 0.1)	.12
Physical activity, METs/min/wk	349.6 (530.6)	1384.7 (893.9)	1035.2 (735.7)	<.001	519.7 (467.9)	553.8 (608.1)	34.1 (424.4)	.63	1001.1 (719.8 to 1282.8)	<.001
HADS score										
Anxiety	7.9 (4.6)	5.3 (3.9)	−2.6 (2.7)	<.001	8.2 (4.3)	7.4 (4.2)	−0.8 (2.3)	.03	−1.8 (−2.9 to −0.6)	.003
Depression	6.0 (4.4)	3.3 (3.2)	−2.7 (3.0)	<.001	6.3 (4.0)	5.8 (3.7)	−0.5 (2.2)	.21	−2.2 (−3.7 to −0.6)	.009
EQ-5D-5L health state score	68.3 (15.2)	82.3 (9.5)	14.0 (10.0)	<.001	70.3 (15.7)	70.7 (16.1)	0.4 (12.9)	.85	13.6 (8.3 to 18.9)	<.001
Health literacy score[a]	1.6 (1.8)	4.3 (1.2)	2.7 (1.6)	<.001	1.7 (2.0)	1.8 (2.1)	0.1 (1.4)	.81	2.6 (1.9 to 3.3)	<.001

Abbreviations: CBCR, center-based cardiac rehabilitation; CBET, community-based exercise treatment; DBP, diastolic blood pressure; EQ-5D-5L, European Quality of Life 5 Dimensions questionnaire; HADS, Hospital Anxiety and Depression Score; HDL, high-density lipoprotein; HSCRP, high-sensitivity C-reactive protein; IL-6, interleukin 6; LDL, low-density lipoprotein; MET, metabolic equivalents; SBP, systolic blood pressure.

SI conversion factors: To convert HDL, LDL, and total cholesterol to mmol/L, multiply by 0.0259 and triglycerides to mmol/L, by 0.0113.

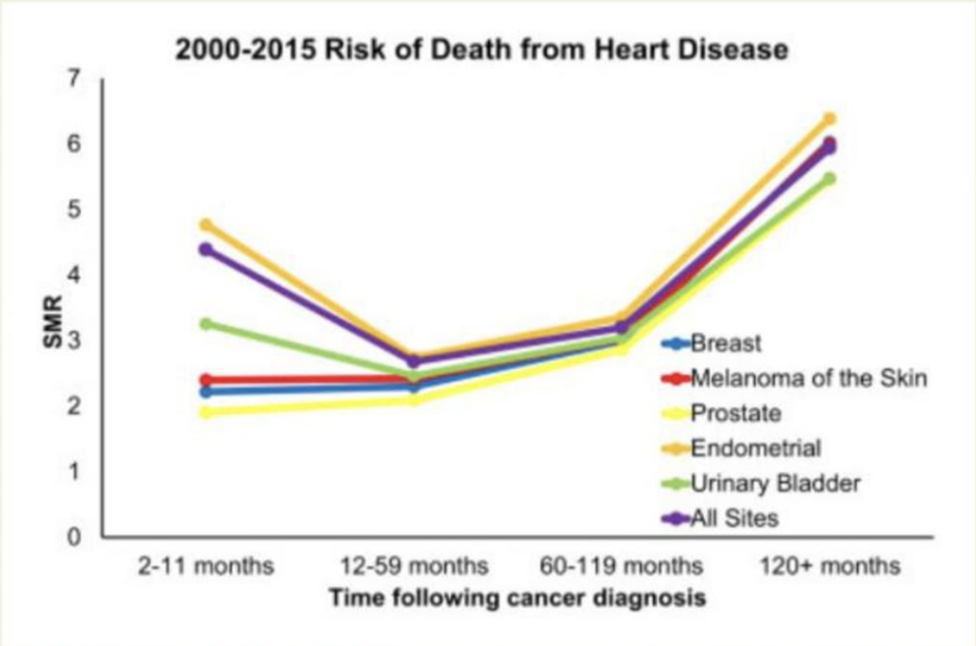
[a] Assessed by the Newest Vital Sign instrument.



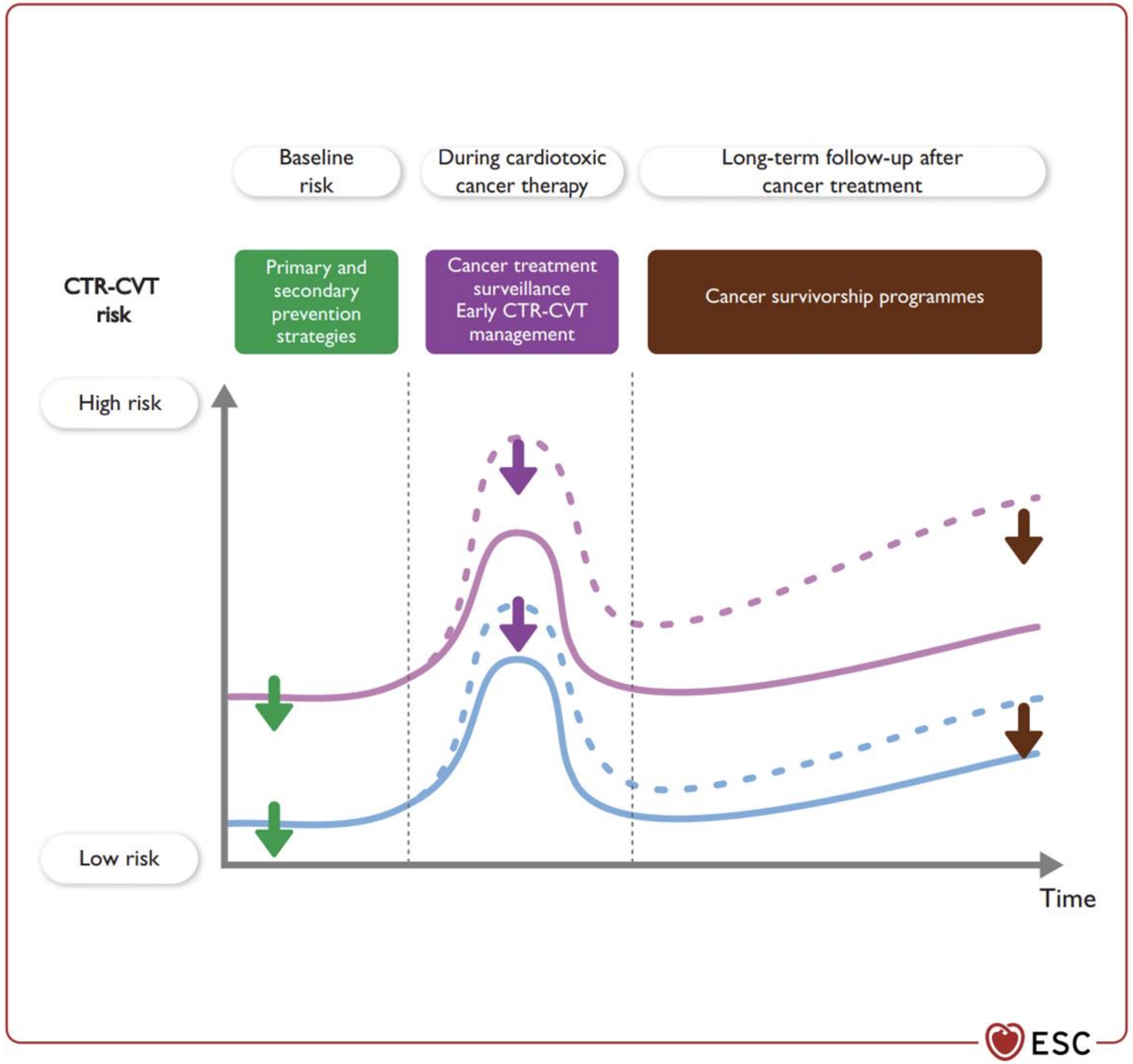
Cardio-oncologie

Cardio-toxicité

La stratégie « cardio »



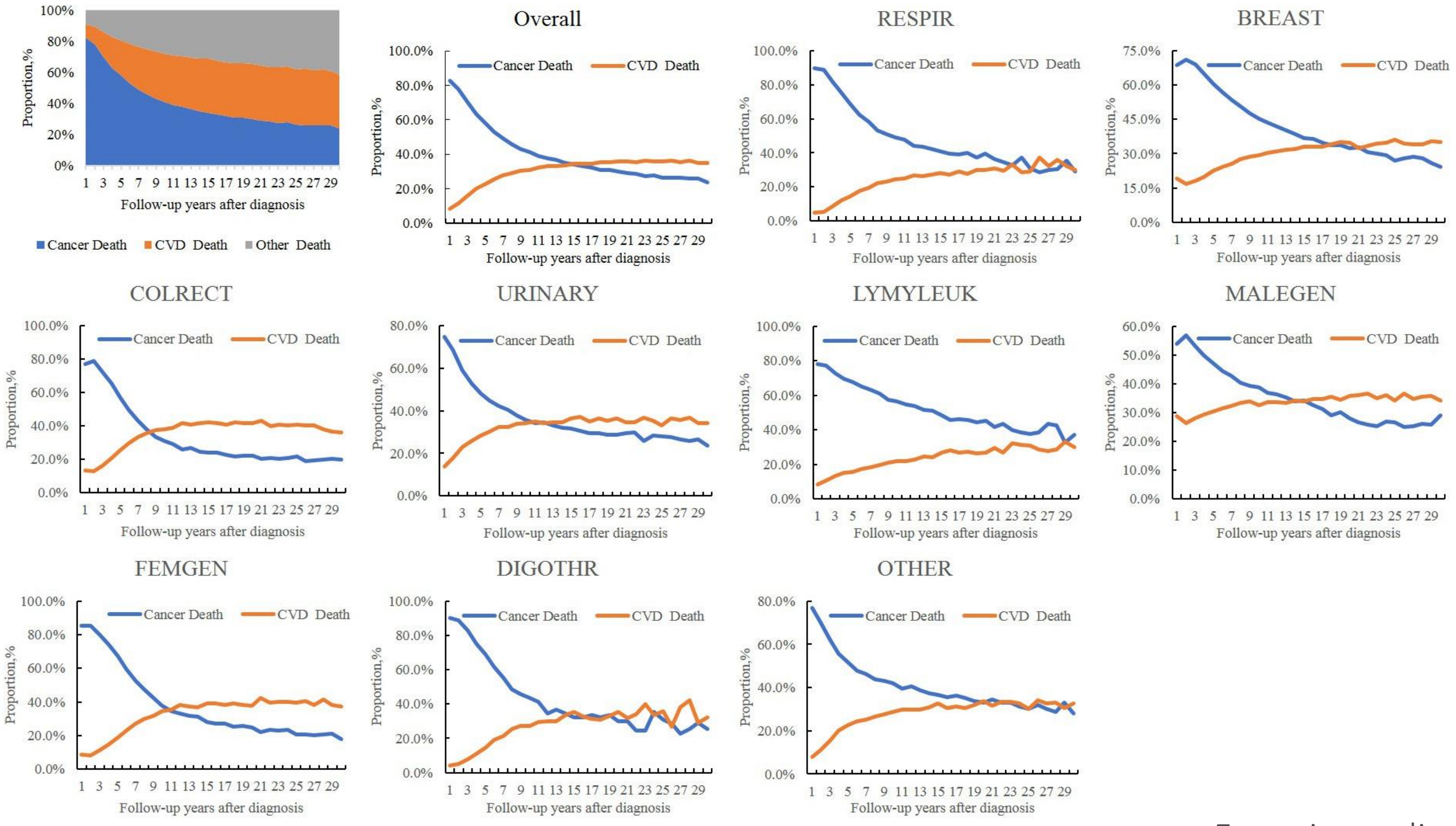
Take home figure Standardized morality ratios for cancer sites with both ≤30% risk of death from the index-cancer and ≥20% risk of mortality from heart disease were calculated and binned by follow-up time. Cancers sites with at least 1000 person years of risk for death from heart disease between 2000 and 2015 were displayed.



Higher risk of cardiovascular mortality than cancer mortality among long-term cancer survivors

Zhipeng Wang[1†], Zeyu Fan[1†], Lei Yang[2], Lifang Liu[3], Chao Sheng[1], Fengju Song[1*‡], Yubei Huang[1*‡] and Kexin Chen[1*‡]

	5 ans	10 ans	20 ans
Mortalité CV	22,8	31	35,7
Mortalité cancer	57,7	41,2	29,9



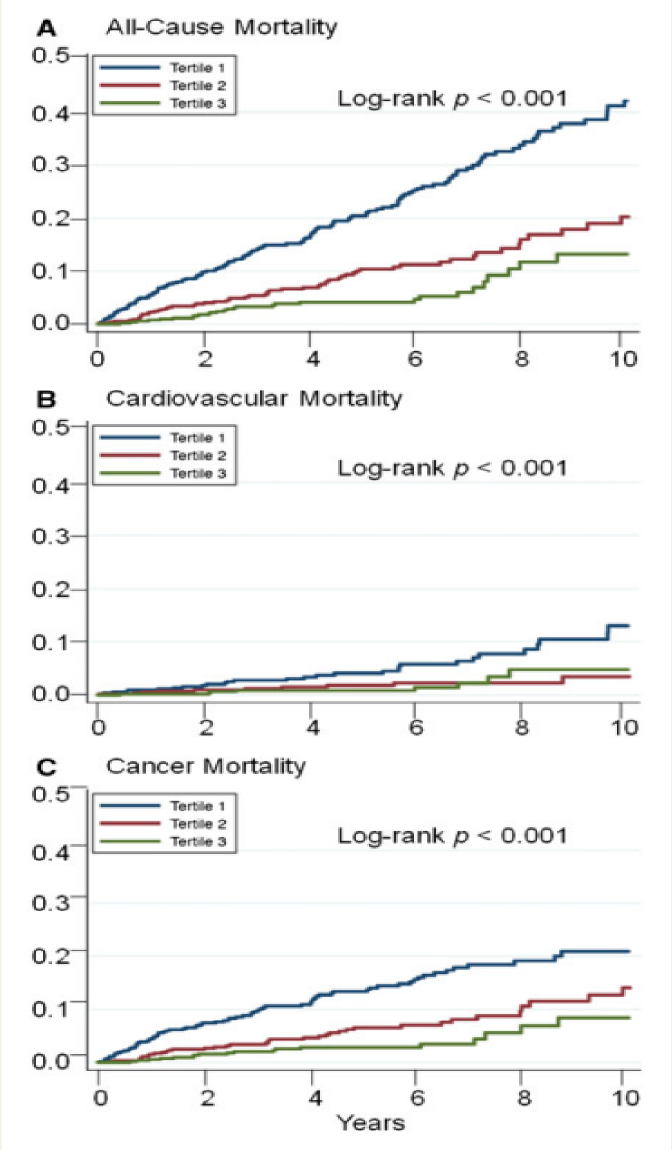
Front in cardiovasc Med 2023

- Le cardiaque est plus à risque de développer un cancer
- Le cardiaque (IC) qui a un cancer présente une mortalité supérieure
  - Les traitements oncologiques sont parfois « sous dosés »
  - Perte de temps lié aux mises au point (cardio)
  - Potentiellement, le patient vomi son traitement cardio (entresto, …)
  - Certains traitements onco nécessite une hydratation +++ (Cisplatine → hydratation de 4,5 litres)
  - Certains traitement engendre des OMI-ascite-OPH
- L'exercice pour diminuer la cardiotoxicité → NON (peut être)
- L'exercice pour contre-carrer la cardiotoxicité → OUI

Association of post-diagnosis cardiorespiratory fitness with cause-specific mortality in cancer

John D. Groarke [1,2], David L. Payne[1], Brian Claggett[1], Mandeep R. Mehra[1], Jingyi Gong[1], Jesse Caron[1], Syed S. Mahmood[3], Jon Hainer[4], Tomas G. Neilan[5], Ann H. Partridge [2], Marcelo Di Carli[4], Lee W. Jones[3*,†], and Anju Nohria [1,2*,†]

Conclusion Cardiorespiratory fitness is a strong, independent predictor of all-cause, CV, and cancer mortality, even after adjustment for important clinical covariates in patients with certain cancers.



Eur Heart J 2020

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INSTITUT JULES BORDET INSTITUUT · Hôpital Erasme · ULB · Hôpital Universitaire des Enfants Reine Fabiola

Cardiorespiratory fitness in breast cancer patients undergoing adjuvant therapy

Oliver Klassen, Martina E. Schmidt, Friederike Scharhag-Rosenberger, Mia Sorkin, Cornelia M. Ulrich, Andreas Schneeweiss, Karin Potthoff, Karen Steindorf & Joachim Wiskemann

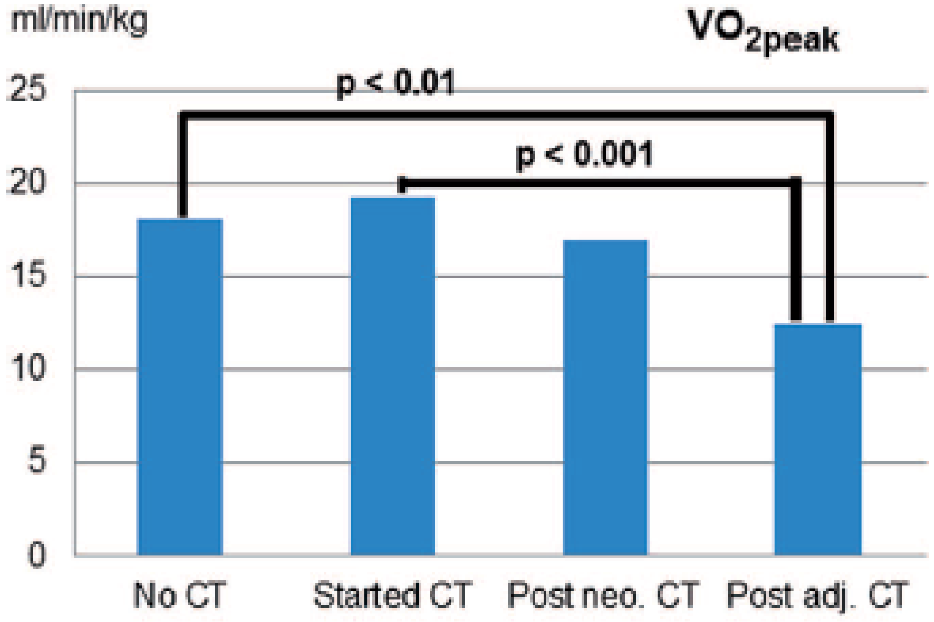


Table II. Maximal (peak) and submaximal fitness parameters, mean (SD).

		TOTAL		No CT		Started CT		Post neo. CT		Post adj. CT	
	n	mean	(SD)	mean	(SD)	mean	(SD)	mean	(SD)	mean	(SD)
Peak fitness measures											
VO_{2peak} relative [ml/min/kg]	176	20.6	(6.7)	19.8	(5.4)	23.0	(7.1)	19.2	(6.8)	15.5	(4.8)
VO_{2peak} absolute [ml/min]	176	1416	(415)	1405	(374)	1544	(424)	1312	(353)	1076	(340)
Peak work rate [W]	176	111	(28)	112	(27)	118	(27)	107	(24)	87	(24)
Peak RER	176	1.18	(0.09)	1.15	(0.08)	1.17	(0.07)	1.22	(0.09)	1.23	(0.11)
Peak HR [beats/min]	176	157	(18)	154	(16)	161	(17)	157	(22)	151	(20)
Submaximal fitness measures											
VT relative [ml/min/kg]	200	10.7	(2.9)	10.3	(2.4)	11.4	(3.4)	10.3	(2.8)	10.0	(2.1)
VT absolute [ml/min]	200	748	(163)	742	(145)	769	(196)	721	(137)	721	(115)
HR at 50 watts [beats/min]	220	112	(16)	107	(13)	115	(15)	114	(16)	119	(19)

CT, chemotherapy; HR, heart rate; RER, respiratory exchange ratio; SD, standard deviation; VO_{2peak}, peak oxygen consumption; VT, ventilatory threshold.

Diminution d'1MET (3,5 ml/Kg.min)
→ augmentation du risque de mortalité cardio-vasculaire de 18 %

Âge moy = +/- 52 ans

Acta oncologica 2014

Conclusion

- Nouveaux challenges pour la kinésithérapie
  - Message de santé publique (prévention primaire)
  - Préhabilitation
  - Pendant les traitements
  - « Pour récupérer » (rémission)
- Il y a exercice et exercice : le cahier des charges devient précis

En savoir plus …, se former ?

Formation réadaptation physique en oncologie

Cette formation, s'adresse à toutes personnes intéressées par la réadaptation dans le domaine de l'oncologie.

Les trois journées successives de formation permettront une approche pluridisciplinaire tant des professions impliquées auprès des patients, que des types de pathologies dont ils peuvent être atteints. Tous les intervenants sont impliqués directement dans la prise en charge des patients.

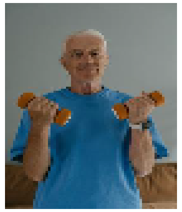
Cette formation se veut interactive et la plus pratique possible, des espaces de discussion sont prévus. Elle permettra aux participants de mieux appréhender les différentes facettes du patient oncologique et de programmer sa réadaptation globalement et de façon optimale, sur une base scientifique solide.

Programme

Jeudi 10 avril
Introduction (*Dr Salengros*)
Oncologie pneumologique (*Dr Hardy*) + prise en charge en kinésithérapie (*R. Moens*)
Oncologie hématologique (*Dr Wolfromm*) + prise en charge en kinésithérapie (*B. Depoorter*)
Cardio-oncologie (*Dr Morra*)

Vendredi 11 avril
Oncologie sénologique (*Dr Polastro*)
Prise en charge kinésithérapie précoce (*S. Darc*)
Aspects psychologiques (*I. Meerckaert*)
Oncologie gastro (*Dr Demols*) + prise en charge en kinésithérapie (*C. Scoubeau*)
DLM et cicatrices (*S. Catelin*)

Samedi 12 avril
Dietétique (*C. Knight*)
Préhabilitation et épreuves à l'effort (*M. Lamotte*)
Revalidation ambulatoire (*L. Blaise*)
Evaluation onco-gériatrique et activité physique en HDJ (*M. Praet*)



Autres renseignements :

- Inscription : 500 € (étudiants : 350 €)
- L'inscription est effective dès versement au compte : BE88 001-0615139-41, communication : 10828701 (uniquement).
- Collations, lunch des midis et attestation de participation prévus.
- Envoi des présentations après la formation.
- Pour favoriser une interactivité optimale, le nombre de participants sera strictement limité à 20 personnes (min 10).
- Lieu : Hôpital Erasme - Local « Chest meeting » 3er étage (Route 401), 808 route de Lennik, 1070 Bruxelles - Belgique.

Contact :

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ACADEMISCH ZIEKENHUIS BRUSSEL

Je vous remercie de votre attention

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INSTITUT JULES BORDET INSTITUUT · Hôpital Erasme · ULB · Hôpital Universitaire des Enfants Reine Fabiola

Feasibility of Aerobic Exercise Training to Mitigate Cardiotoxicity of Breast Cancer Therapy: A Systematic Review and Meta-Analysis

Yu-Lin Tsai,[1] Ya-Chi Chuang,[2] Carl PC Chen,[3,4] Yu-Chun Lee,[1,5,6]
Yuan-Yang Cheng,[1,7,8] Liang-Jun Ou-Yang[3]

The purpose of this meta-analysis was to evaluate the effectiveness of adjunctive aerobic exercise in mitigating cardiotoxicity caused by breast cancer therapy. The current evidence shows that cardiorespiratory fitness significantly improves after the intervention, while left ventricular ejection fraction and peak oxygen pulse did not receive any significant effects.

Background: Current anticancer treatments for breast cancer (BC) may cause cardiotoxicity. This study aimed to investigate the effectiveness of aerobic exercise in mitigating cardiotoxicity caused by BC therapy. **Materials and Methods:** PubMed, Embase, Cochrane Library, Web of Science, and the Physiotherapy Evidence Database were searched until February 7, 2023. Clinical trials investigating the effectiveness of exercise training, including aerobic exercise, in BC patients receiving treatments that could cause cardiotoxicity were eligible. Outcome measures included cardiorespiratory fitness (CRF) (peak oxygen consumption, VO_2peak), left ventricular ejection fraction, and peak oxygen pulse. Intergroup differences were determined by standard mean differences (SMD) and 95% confidence intervals (CIs). Trial sequential analysis (TSA) was utilized to ensure whether the current evidence was conclusive. **Results:** Sixteen trials involving 876 participants were included. Aerobic exercise significantly improved CRF measured by VO_2peak in mL/kg/min (SMD 1.79, 95% CI 0.99-2.59) when compared to usual care. This result was confirmed through TSA. Subgroup analyses revealed that aerobic exercise given during BC therapy significantly improved VO_2peak (SMD 1.84, 95% CI 0.74-2.94). Exercise prescriptions at a frequency of up to 3 times per week, an intensity of moderate to vigorous, and a >30-minute session length also improved VO_2peak. **Conclusion:** Aerobic exercise is effective in improving CRF when compared to usual care. Exercise performed up to 3 times per week, at a moderate-to-vigorous intensity, and having a session length >30 minutes is considered effective. Future high-quality research is needed to determine the effectiveness of exercise intervention in preventing cardiotoxicity caused by BC therapy.

Clinical Breast Cancer, Vol. 23, No. 6, 576–590

Cancer et exercices

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ACADEMISCH ZIEKENHUIS BRUSSEL

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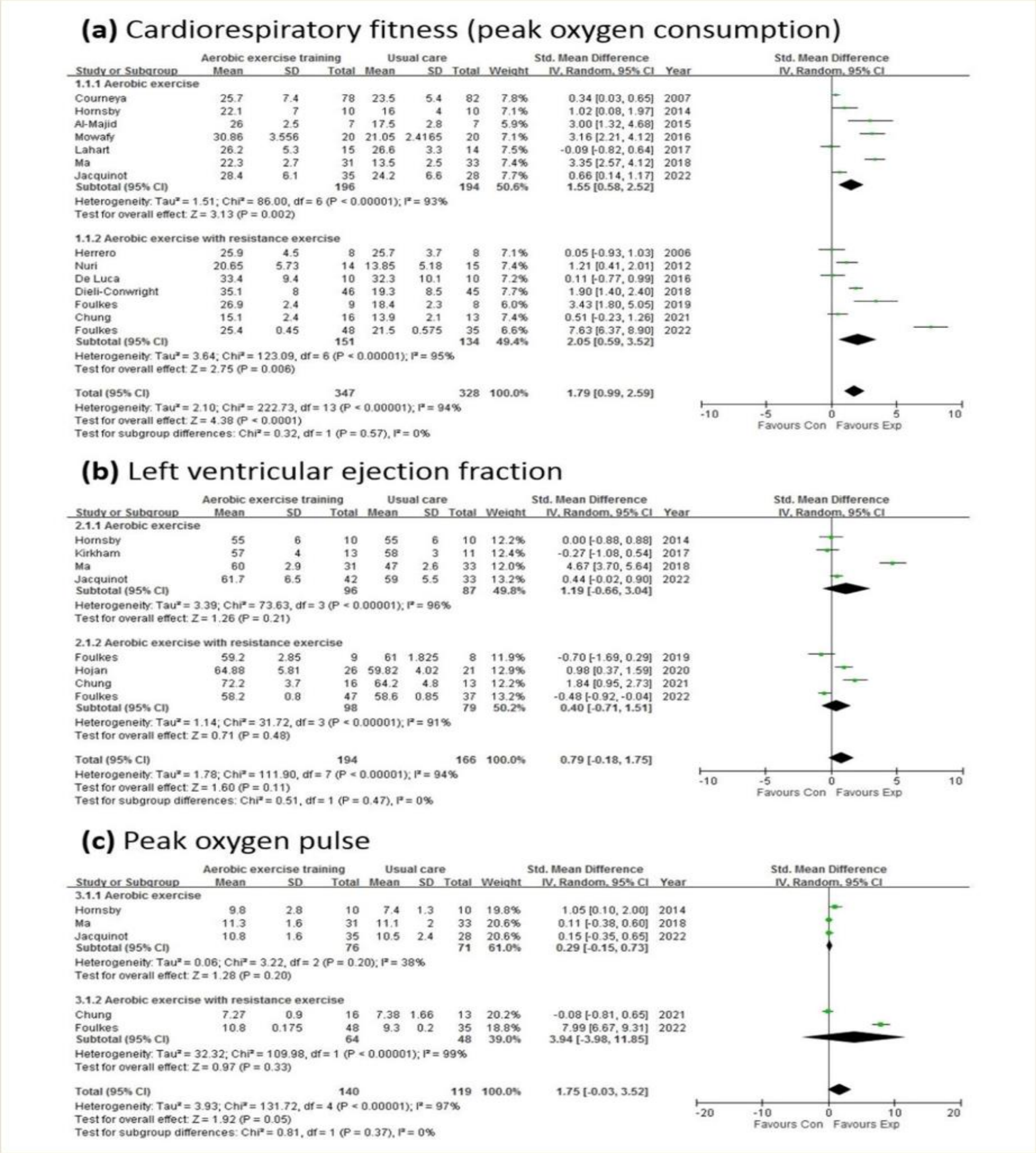
Yu-Lin Tsai,[1] Ya-Chi Chuang,[2] Carl PC Chen,[3,4] Yu-Chun Lee,[1,5,6] Yuan-Yang Cheng,[1,7,8] Liang-Jun Ou-Yang[3]

Figure 3 Standard mean difference (95% confidence interval) of the effect of aerobic exercise on cardiorespiratory fitness (A), left ventricular ejection fraction (B), and peak oxygen pulse (C), compared with usual care.



Prévention secondaire : phase II

Table 4. Age-and Multivariable-Adjusted HRs According to Duration of Nonvigorous and Vigorous Physical Activity After Prostate Cancer Diagnosis

Measure	Duration of Nonvigorous Activity					*P* for Trend	Duration of Vigorous Activity			*P* for Trend
	< 1 h/wk	1 to < 3 h/wk	3 to < 5 h/wk	5 to < 10 h/wk	≥ 10 h/wk		< 1 h/wk	1 to < 3 h/wk	≥ 3 h/wk	
Median duration per week on first postdiagnosis questionnaire, hours	0	1.6	3.5	6.0	15.5		0	1.5	5	
All deaths (n = 536)										
No. of deaths	178	148	31	126	53		371	122	43	
Age-adjusted HR	1.00	0.78	0.63	0.66	0.44	< .001	1.00	0.90	0.47	< .001
95% CI		0.62 to 0.98	0.43 to 0.94	0.52 to 0.84	0.32 to 0.61			0.73 to 1.11	0.34 to 0.65	
Multivariable-adjusted HR*	1.00	0.80	0.73	0.74	0.52	< .001	1.00	0.98	0.50	< .001
95% CI		0.64 to 1.01	0.49 to 1.08	0.58 to 0.95	0.37 to 0.71			0.79 to 1.22	0.36 to 0.70	
Multivariable-adjusted HR†	1.00	0.79	0.70	0.72	0.49	< .001	1.00	1.00	0.51	< .001
95% CI		0.63 to 1.00	0.47 to 1.04	0.56 to 0.93	0.35 to 0.69			0.80 to 1.25	0.36 to 0.72	
Prostate cancer deaths (n = 111)										
No. of prostate cancer deaths	26	33	11	29	12		71	31	9	
Age-adjusted HR	1.00	1.03	1.30	1.05	0.65	.21	1.00	1.10	0.33	.04
95% CI		0.61 to 1.74	0.63 to 2.70	0.61 to 1.80	0.32 to 1.32			0.71 to 1.70	0.08 to 1.37	
Multivariable-adjusted HR‡	1.00	1.04	1.47	1.12	0.75	.41	1.00	1.17	0.46	.06
95% CI		0.61 to 1.78	0.69 to 3.12	0.64 to 1.97	0.37 to 1.52			0.74 to 1.83	0.23 to 0.94	
Multivariable-adjusted HR§	1.00	1.08	1.46	1.13	0.79	.46	1.00	1.13	0.39	.03
95% CI		0.63 to 1.87	0.68 to 3.14	0.64 to 2.01	0.37 to 1.66			0.70 to 1.83	0.18 to 0.84	

NOTE. Physical activity was updated over follow-up. Men were alive for at least 4 years after their postdiagnosis physical activity assessments, and we only used activity information from 4 to 6 years before death. When examining nonvigorous and vigorous physical activity, we mutually adjusted for both. Twelve men who died (one from prostate cancer) did not contribute to analyses on duration of exercise because they only reported stair climbing as physical activity.

Abbreviation: HR, hazard ratio.

*Adjusted for age at diagnosis, months since diagnosis, clinical stage, Gleason score, treatment, parental history of myocardial infarction at age 60 years or younger, high blood pressure, elevated cholesterol, and diabetes status from the prediagnostic questionnaire; smoking status, body mass index, and alcohol intake from the first postdiagnostic questionnaire; and comorbidities (coded as yes if participant reported any of the following: myocardial infarction, coronary artery bypass or coronary angioplasty, stroke, Parkinson's disease, and emphysema or chronic bronchitis). This variable was updated over follow-up, and comorbidity status was applied one cycle prior to physical activity exposure.

†Additionally adjusted for prediagnosis physical activity.

‡Adjusted for age at diagnosis, months since diagnosis, clinical stage, Gleason score, treatment, and postdiagnosis body mass index.

§Additionally adjusted for prediagnosis physical activity.

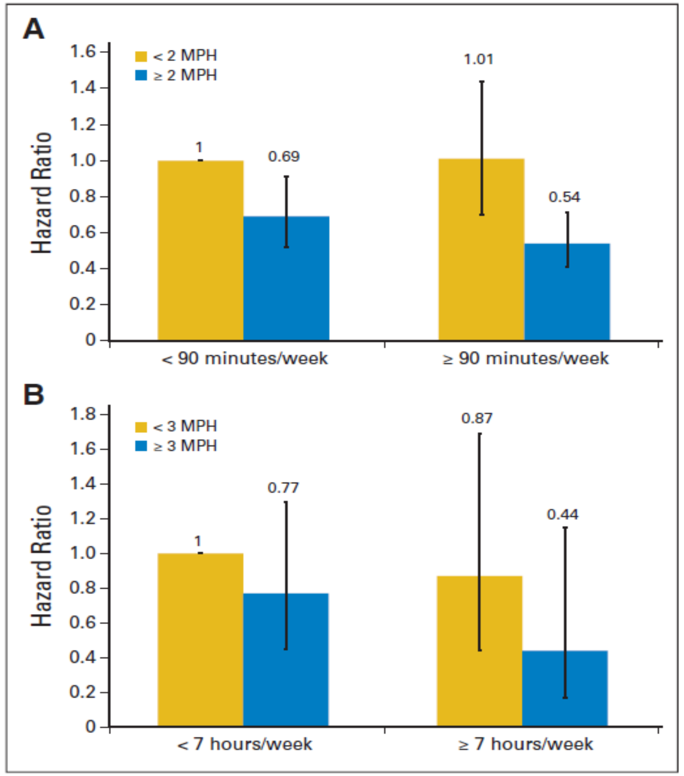


Fig 1. Multivariable-adjusted hazard ratios for (A) all-cause mortality and (B) prostate cancer mortality according to categories of walking duration and pace after prostate cancer diagnosis. An easy pace is less than 2 mile per hour (MPH), a normal pace is 2 to 2.9 MPH, and a brisk pace is ≥ 3 MPH. See footnotes in Table 3 for variables included in the multivariable models for overall and prostate cancer mortality.

Highly favorable physiological responses to concurrent resistance and high-intensity interval training during chemotherapy: the OptiTrain breast cancer trial

Sara Mijwel[1,2] · Malin Backman[2,8] · Kate A. Bolam[2,3] · Emil Olofsson[4] · Jessica Norrbom[1] · Jonas Bergh[5,6] · Carl Johan Sundberg[1,7] · Yvonne Wengström[2,8] · Helene Rundqvist[4]

240 femmes, néo sein

Pendant la chimio

- Gr RT+HIIT
- Gr AT+HIIT
- Gr usual care

Force

BMI ?

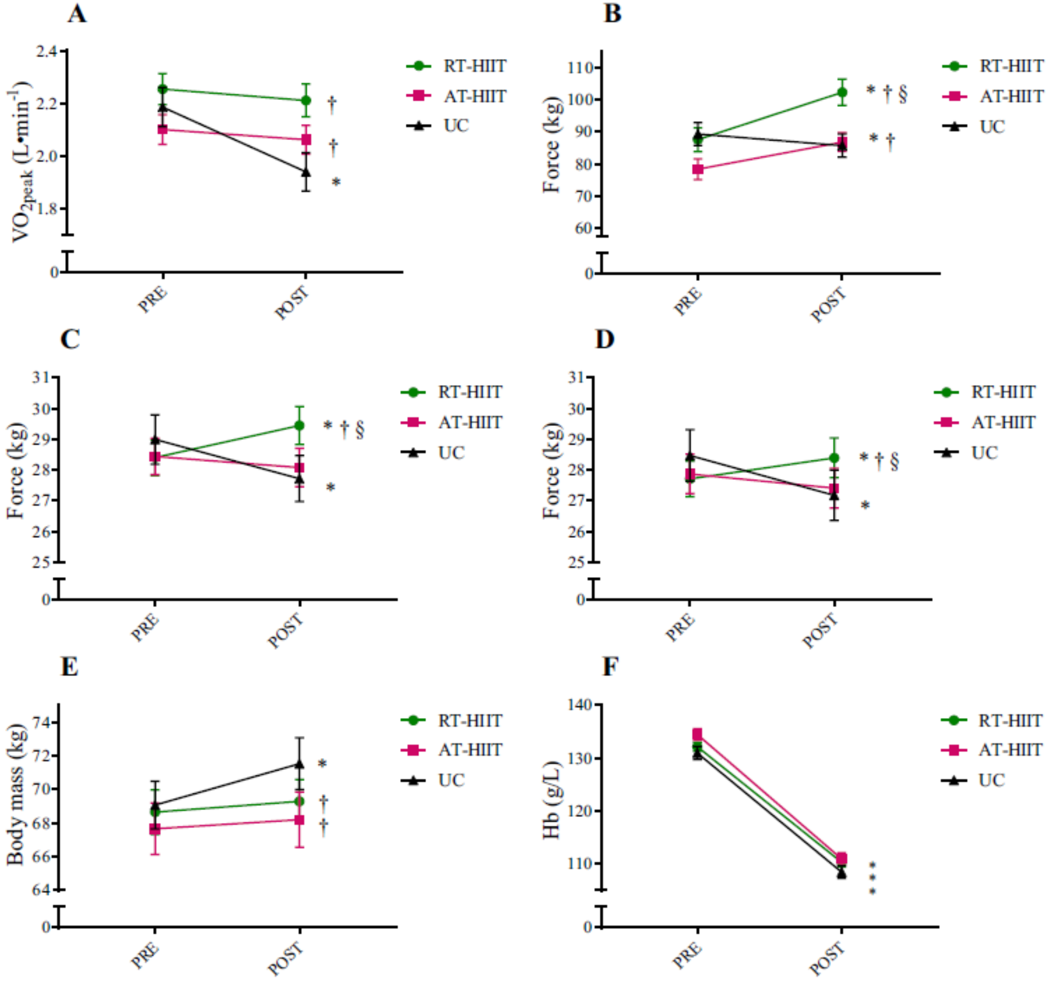


Fig. 1 Effects of concurrent resistance and high-intensity interval training (RT-HIIT) and moderate-intensity aerobic and high-intensity interval training (AT-HIIT) versus usual care (UC) on physiological outcomes: **a** estimated VO_{2peak}, **b** isometric mid-thigh pull, **c** handgrip strength surgery side, **d** handgrip strength non-surgery side, **e** body mass, and **f** hemoglobin levels. $^{*}p < 0.05$ at post versus pre measurement; $^{†}p < 0.05$ compared to UC; $^{§}p < 0.05$ between RT-HIIT and AT-HIIT. Data is presented as mean and standard error of the mean. No statistically significant differences were found at baseline between groups

Highly favorable physiological responses to concurrent resistance and high-intensity interval training during chemotherapy: the OptiTrain breast cancer trial

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240 femmes, néo sein

Pendant la chimio

- Gr RT+HIIT
- Gr AT+HIIT
- Gr usual care

Effets sur la douleur ?

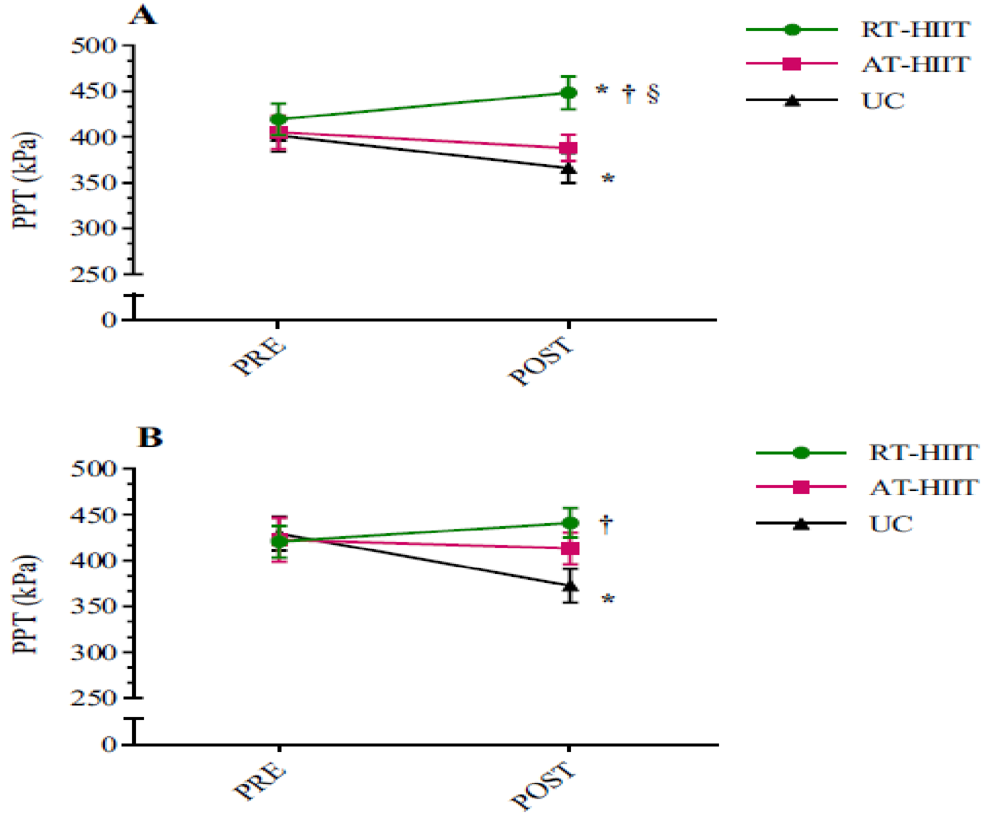

Fig. 2 Pressure-pain thresholds (PPT) for **a** trapezius muscle, **b** gluteus muscle. *RT-HIIT* resistance and high-intensity interval training, *AT-HIIT* moderate-intensity aerobic and high-intensity interval training, *UC* usual care. $^{*}p < 0.05$ at post versus pre measurement; $^{\dagger}p < 0.05$ compared to UC; $^{\S}p < 0.05$ between RT-HIIT and AT-HIIT. Data is presented as mean and standard error of the mean. No statistically significant differences were found at baseline between groups

Adding high-intensity interval training to conventional training modalities: optimizing health-related outcomes during chemotherapy for breast cancer: the OptiTrain randomized controlled trial

Sara Mijwel[1,2] · Malin Backman[2,9] · Kate A. Bolam[2,3] · Anna Jervaeus[2] · Carl Johan Sundberg[1,4] · Sara Margolin[5,6] · Maria Browall[2,7] · Helene Rundqvist[8] · Yvonne Wengström[2,9]

240 femmes, néo sein

Pendant la chimio

- Gr RT+HIIT
- Gr AT+HIIT
- Gr usual care

Effets sur la fatigue et symptômes ?

Fig. 2 Baseline status and change after 16 weeks for the outcomes. **a** CRF (assessed by the Piper fatigue scale), **b** global HRQoL (assessed by the European Organization for Research and Treatment of cancer quality of life questionnaire), **c** symptom burden (assessed by the Memorial symptom assessment scale), and **d** total symptom score (assessed by the Memorial symptom assessment scale). *CRF* cancer-related fatigue, *HRQoL* health-related quality of life, *CRF* cancer-related fatigue, *HRQoL* health-related quality of life, *RT–HIIT* resistance and high-intensity interval training, *AT–HIIT* moderate-intensity aerobic and high-intensity interval training, *UC* usual care