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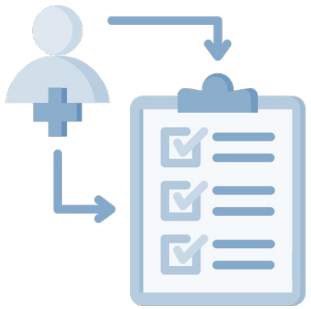
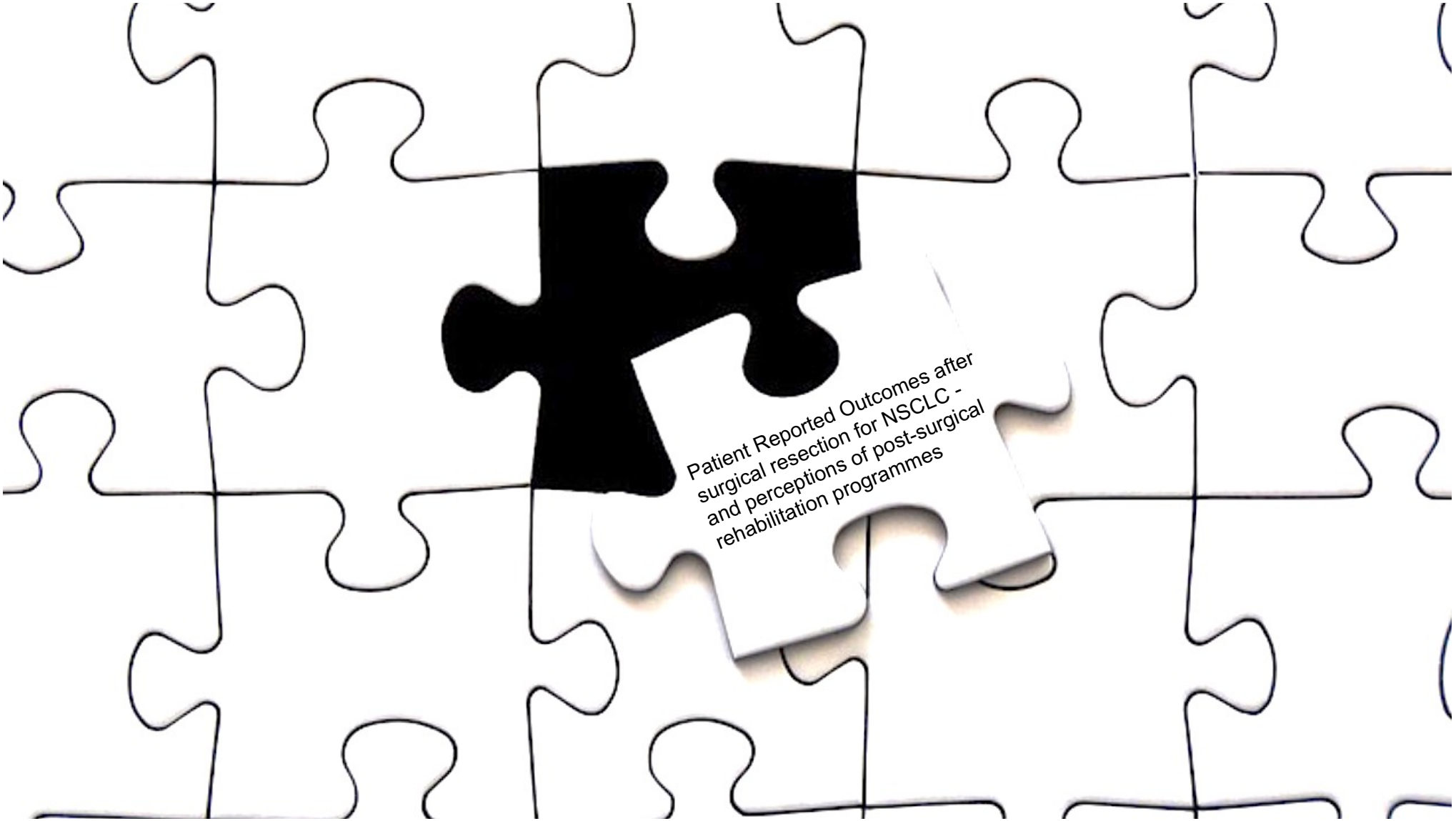
Patient Reported Outcomes after surgical resection for NSCLC - and perceptions of post-surgical rehabilitation programmes

Mette Kaasgaard, Associate Professor, PhD




Patient Reported Outcomes after surgical resection for NSCLC - and perceptions of post-surgical rehabilitation programmes

Mette Kaasgaard, Associate Professor, PhD

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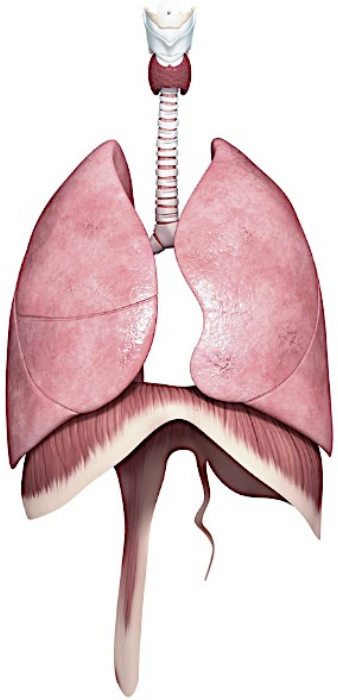
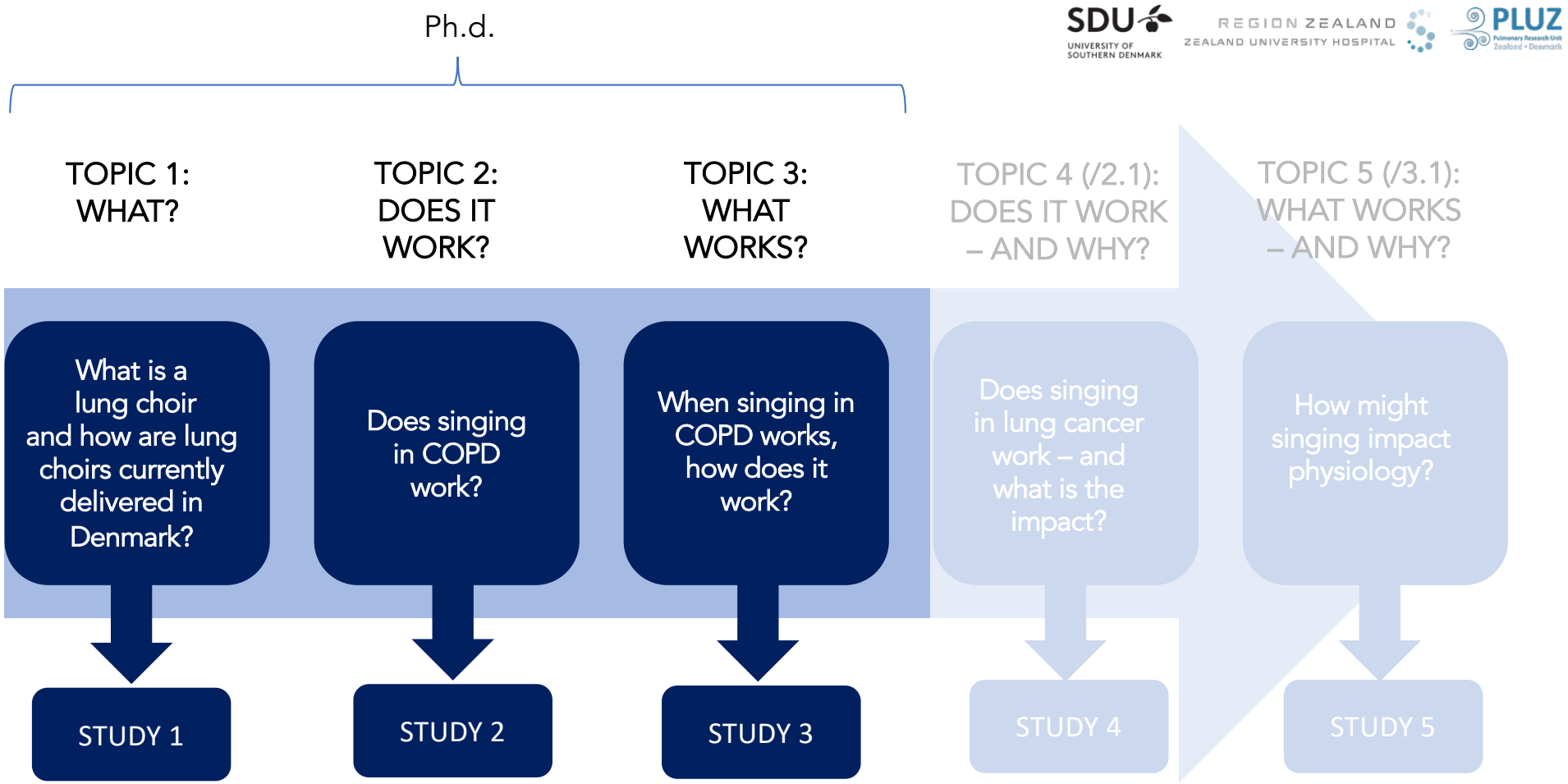
Tilknyttet Lungemedicinsk Forskningsenhed, SUH i Næstved og Roskilde, og samarbejder der ud over med klinikere og forskere i ind- og udland.

Projekterne har bl.a. opnået støtte fra Forskningscenter for Lungekræft

Singing?


Syng dig til mere luft
hvalpe?
Da Carsten fik KOL, begyndte et liv med frivilligt
arbejde
Del
Mail
Print
Mere
Forside
Livshistorier
Mennesker imellem
Rosa har KOL: Jeg bli'r så glad i låget, når jeg synger
Rosa har KOL: Jeg bli'r så glad i låget, når jeg synger





Under min PhD så jeg på, om struktureret sang kunne være relevant i lungerehabilitering for mennesker med KOL.

Background: Pulmonary Rehabilitation (PR)

Aims and frames of PR

- Key component in modern COPD care
- Multi-dimensional and multi-disciplinary intervention
- Aim: To support patients both physiologically and psycho-socially
- Duration: 6-8 weeks' course (up to 12 weeks)
- Setting: Inpatient or outpatient setting

Content and assessment of PR

- Validated, evidence-based activities
- Patient education, smoking cessation, self-management
- Gold standard: Physical exercise training (PExT)
- Endurance training and strenght training
- PExT is often assessed by walking test (6MWT or ISWT)

Background: Pulmonary Rehabilitation (PR)

Aims and frames of PR

- Key component in modern COPD care
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- Aim: To support
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Content and assessment of PR

- Validated, evidence-based activities

tion, self-management

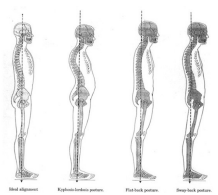
raining (PExT)
raining
test (6MWT or ISWT)

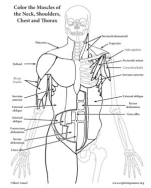
Adherence and maintenance remain a challenge

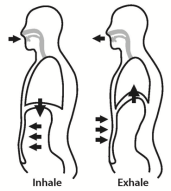
- Availability
- Lack of awareness and/or lack of referral
- Transporation issues
- Motivation and experience of relevance
- Inability to perform physical exercise training (PExT)

Request for new, relevant activities to supplement PExT in PR

Relevance in pulmonary rehabilitation?







Physiologically oriented activity

- Singing involves the whole body
- Training effect without noticing….
- *"Singing and breathing are intimately related"*[1]

Psychosocially oriented activity

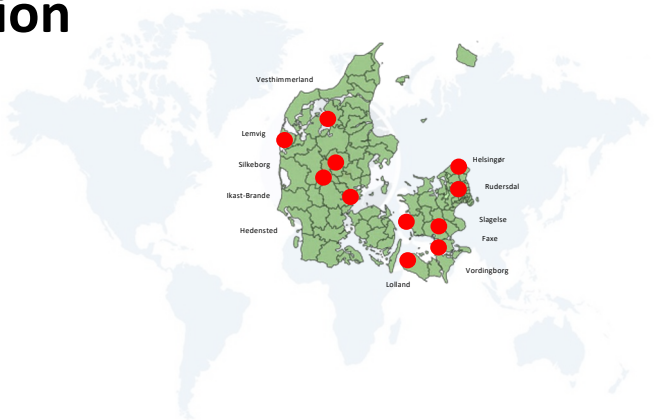
- Associated with joy and cohesion
- Being among peers
- Break isolation
- Not focusing on the disease
- Spiritual aspects, meaning

- Long-term upkeep – fidelity/"familly"
- Activity and engagement in local community

Relevant as part of PR?

1. Lewis A, Philip KEJ, Lound A, *et al*. The physiology of singing and implications for 'Singing for Lung Health' as a therapy for individuals with chronic obstructive pulmonary disease. *BMJ Open Respiratory Research* 2021

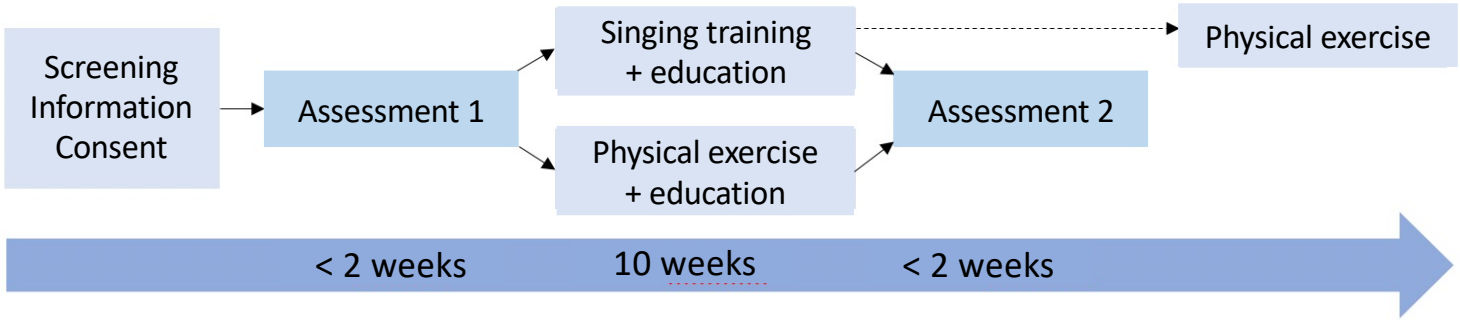
Singing training vs physical exercise training within 10 weeks' community-based pulmonary rehabilitation for chronic obstructive pulmonary disease (COPD)



STUDY TYPE
Multicentre, randomised controlled trial (RCT) (NCT03280355)

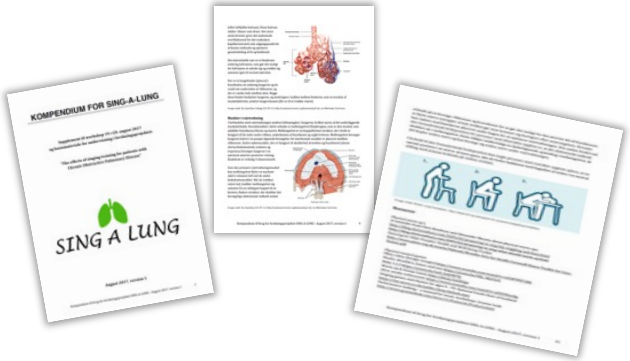
SETTING
Conducted between August 2017 and May 2019 in community-based PR-services

PARTICIPANTS
COPD patients referred for community-based pulmonary rehabilitation (PR)

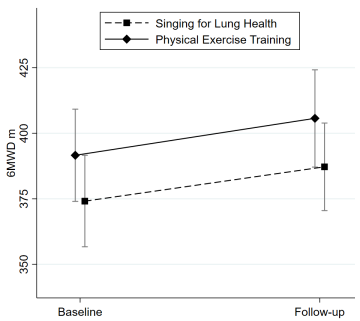


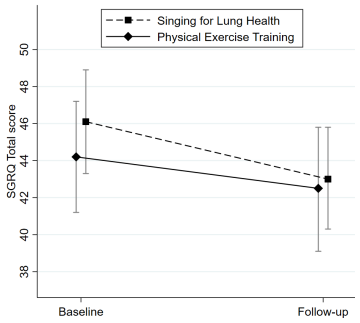
Intervention: Singing for Lung Health

Som sangintervention anvendte vi den sygdomsspecifikke og strukturerede tilgang, Singing for Lung Health, som er udviklet i en sundhedsfaglig setting i Storbritannien (siden 2007), og som et antal danske sanglærere så blev særligt trænede i forud for projektet.



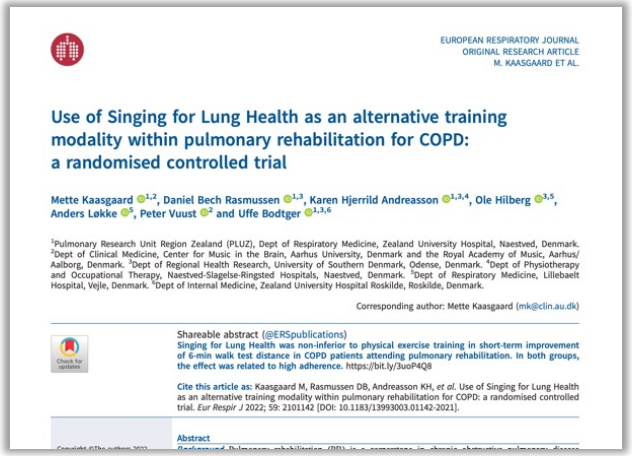
1. Cave Lewis A Fancourt D, P. Singing for Lung Health. in *Routledge Companion to Interdisciplinary Research in Singing* (ed. Heydon R, F. D. & C. A.) Volume iii Wellbeing,
2. Lewis, A. *et al*. Singing for Lung Health-a systematic review of the literature and consensus statement. *NPJ Prim Care Respir Med* **26**, 16080 (2016).
3. Lewis, A., Cave, P. & Hopkinson, N. S. Singing for Lung Health: a qualitative assessment of a British Lung Foundation programme for group leaders. *BMJ Open Respir Res* **4**, e000216 (2017).





Primary outcome: Physiocal capacity (6MWD)
(p=0.81) [95%CI -7.28;9.30]

Secondary outcome: Quality of life (SGRQ Total Score)
(p=0.16) [95%CI -0.62;3.73]



EUROPEAN RESPIRATORY JOURNAL
ORIGINAL RESEARCH ARTICLE
M. KAASGAARD ET AL.

Use of Singing for Lung Health as an alternative training modality within pulmonary rehabilitation for COPD: a randomised controlled trial

Mette Kaasgaard, Daniel Bech Rasmussen, Karen Hjerrild Andreasson, Ole Hilberg, Anders Løkke, Peter Vuust and Uffe Bodtger

Shareable abstract (@ERSpublications)
Singing for Lung Health was non-inferior to physical exercise training in short-term improvement of 6-min walk test distance in COPD patients attending pulmonary rehabilitation. In both groups, the effect was related to high adherence. https://bit.ly/3uoP4Q8

Cite this article as: Kaasgaard M, Rasmussen DB, Andreasson KH, *et al*. Use of Singing for Lung Health as an alternative training modality within pulmonary rehabilitation for COPD: a randomised controlled trial. *Eur Respir J* 2022; 59: 2101142 [DOI: 10.1183/13993003.01142-2021].

Abstract

EUROPEAN RESPIRATORY *journal*
FLAGSHIP SCIENTIFIC JOURNAL OF ERS

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Adherence to singing training vs. Physical training in COPD rehabilitation

Mette Kaasgaard, Daniel Bech Rasmussen, Karen Andreasson, Anders Løkke, Peter Vuust, Ole Hilberg, Uffe Bodtger
European Respiratory Journal 2021 58: PA320; DOI: 10.1183/13993003.congress-2021.PA320

Article | Info & Metrics

Abstract

Pulmonary rehabilitation (PR) is a cornerstone in COPD care, however, maintaining high adherence rates is challenging. In a multicenter, randomized, controlled trial (RCT), we demonstrated that singing training (ST) was as effective as standard physical training (PT) in PR in improving Six-Minute Walk Test (6MWT) and superior concerning quality of life. There is no knowledge about impact of adherence on change in 6MWT and St George's Respiratory Questionnaire (SGRQ), or factors related to adherence.

Thus, we performed Post hoc analyses of the RCT (effects of ST compared to PT in a 10 weeks' PR programme in COPD). We did multivariable logistic regression analyses of 1) relationship between adherence (low: 0-49%; medium: 50-74%; high: 75-100%) and achieving clinically

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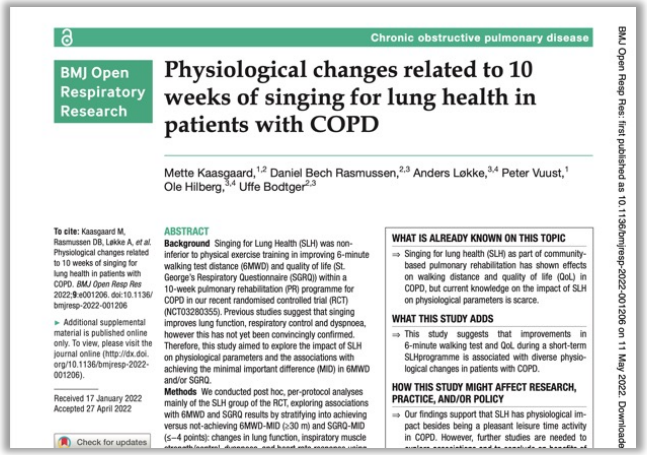

Chronic obstructive pulmonary disease

BMJ Open Respiratory Research

Physiological changes related to 10 weeks of singing for lung health in patients with COPD

Mette Kaasgaard,[1,2] Daniel Bech Rasmussen,[2,3] Anders Løkke,[3,4] Peter Vuust,[1] Ole Hilberg,[3,4] Uffe Bodtger[2,3]

To cite: Kaasgaard M, Rasmussen DB, Løkke A, *et al*. Physiological changes related to 10 weeks of singing for lung health in patients with COPD. *BMJ Open Resp Res* 2022;**9**:e001206. doi:10.1136/bmjresp-2022-001206

► Additional supplemental material is published online only. To view, please visit the journal online (http://dx.doi.org/10.1136/bmjresp-2022-001206).

Received 17 January 2022
Accepted 27 April 2022

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ABSTRACT

Background Singing for Lung Health (SLH) was non-inferior to physical exercise training in improving 6-minute walking test distance (6MWD) and quality of life (St. George's Respiratory Questionnaire (SGRQ)) within a 10-week pulmonary rehabilitation (PR) programme for COPD in our recent randomised controlled trial (RCT) (NCT03280355). Previous studies suggest that singing improves lung function, respiratory control and dyspnoea, however this has not yet been convincingly confirmed. Therefore, this study aimed to explore the impact of SLH on physiological parameters and the associations with achieving the minimal important difference (MID) in 6MWD and/or SGRQ.

Methods We conducted post hoc, per-protocol analyses mainly of the SLH group of the RCT, exploring associations with 6MWD and SGRQ results by stratifying into achieving versus not-achieving 6MWD-MID (≥30 m) and SGRQ-MID (≤−4 points): changes in lung function, inspiratory muscle

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Singing for lung health (SLH) as part of community-based pulmonary rehabilitation has shown effects on walking distance and quality of life (QoL) in COPD, but current knowledge on the impact of SLH on physiological parameters is scarce.

WHAT THIS STUDY ADDS

⇒ This study suggests that improvements in 6-minute walking test and QoL during a short-term SLHprogramme is associated with diverse physiological changes in patients with COPD.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE, AND/OR POLICY

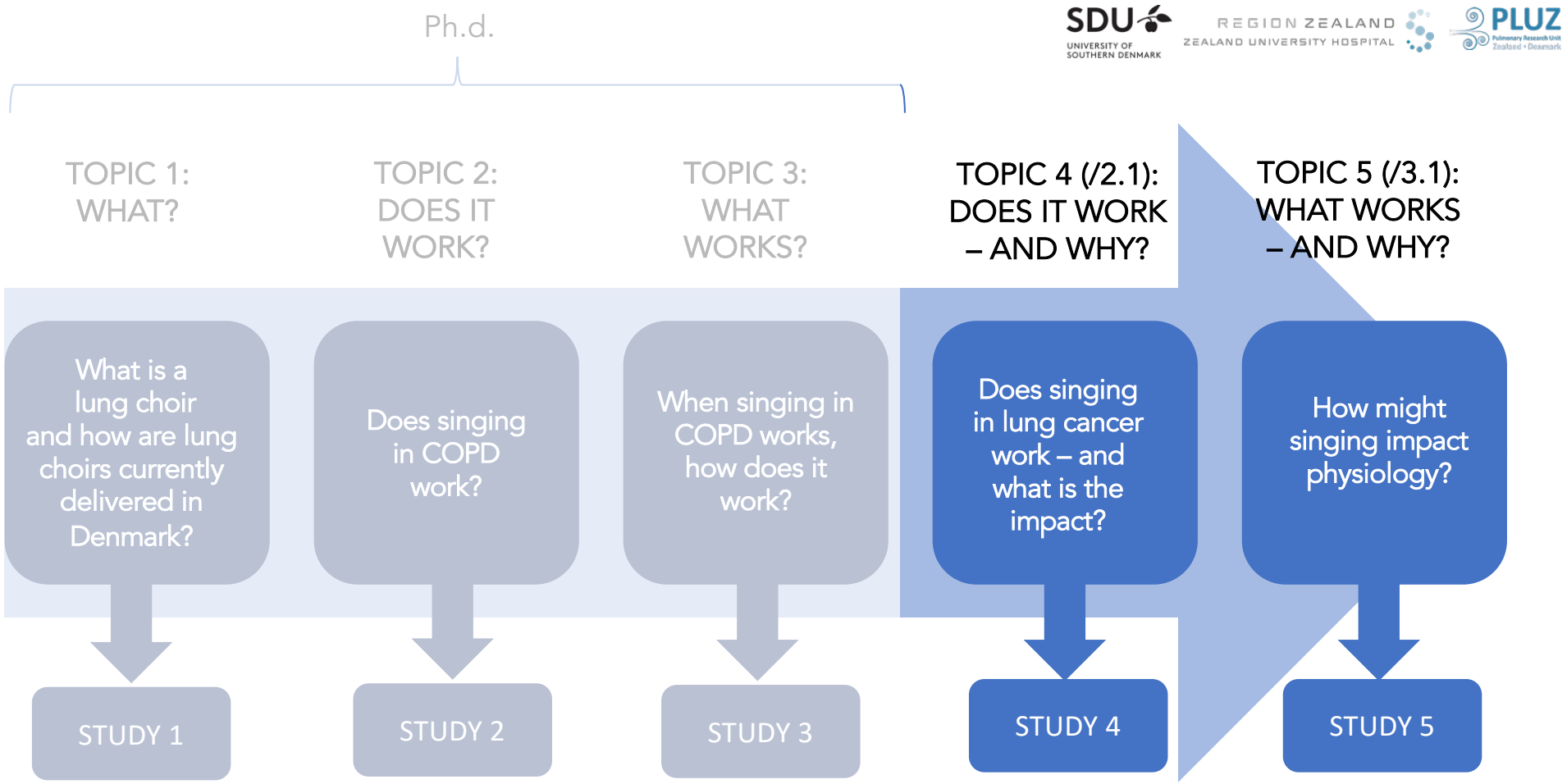
⇒ Our findings support that SLH has physiological impact besides being a pleasant leisure time activity in COPD. However, further studies are needed to

BMJ Open Resp Res: first published as 10.1136/bmjresp-2022-001206 on 11 May 2022. Downloaded

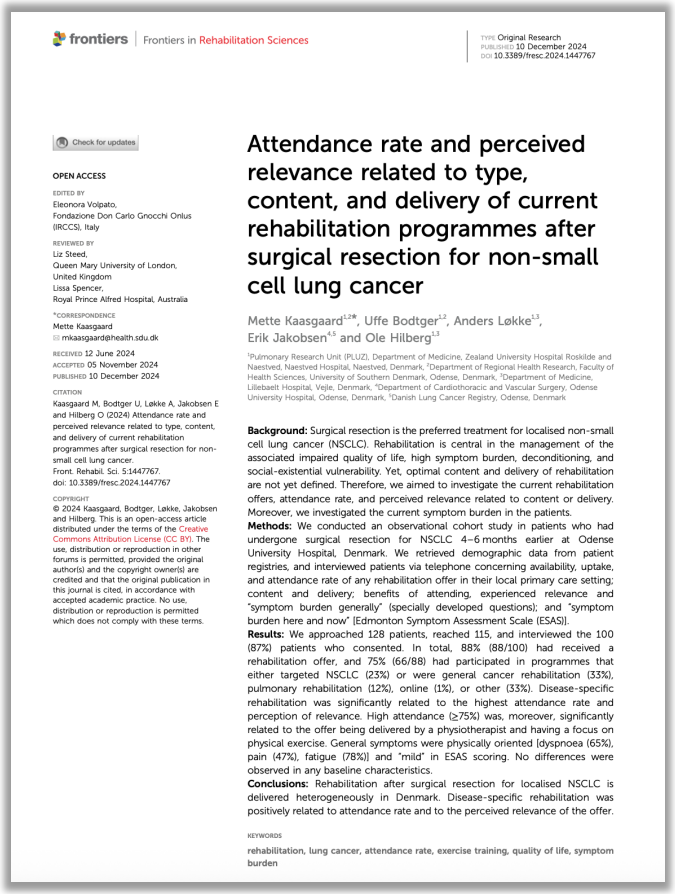
Use of Singing for Lung Health as an alternative training modality within pulmonary rehabilitation for COPD: an RCT. 2021. M. Kaasgaard, D. Bech Rasmussen, K. Andreasson, A. Løkke, P. Vuust, O. Hilberg, U. Bodtger. European Respiratory Journal 2021.DOI:10.1183/13993003.01142-2021

Adherence to singing training vs. Physical training in COPD rehabilitation. Kaasgaard M, Bech Rasmussen D, Andreasson K, et al. *Rehabilitation and Chronic Care*. European Respiratory Society; 2021:PA320. doi:10.1183/13993003.congress-2021.PA320

Physiological changes related to 10 weeks of Singing for Lung Health in patients with COPD. M. Kaasgaard, D. Bech Rasmussen, A. Løkke, P. Vuust, O. Hilberg, U. Bodtger. BMJ Open Respiratory Research 2022. DOI: 10.1136/bmjresp-2022-00120



Planlægning af kommende RCT: Kan sangtræning ligeledes være relevant som tilbud efter operation for NSCLC?



frontiers | Frontiers in Rehabilitation Sciences

TYPE Original Research
PUBLISHED 10 December 2024
DOI 10.3389/fresc.2024.1447767

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RECEIVED 12 June 2024
ACCEPTED 05 November 2024
PUBLISHED 10 December 2024

CITATION
Kaasgaard M, Bodtger U, Løkke A, Jakobsen E and Hilberg O (2024) Attendance rate and perceived relevance related to type, content, and delivery of current rehabilitation programmes after surgical resection for non-small cell lung cancer.
Front. Rehabil. Sci. 5:1447767.
doi: 10.3389/fresc.2024.1447767

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Attendance rate and perceived relevance related to type, content, and delivery of current rehabilitation programmes after surgical resection for non-small cell lung cancer

Mette Kaasgaard[1,2]*, Uffe Bodtger[1,2], Anders Løkke[1,3], Erik Jakobsen[4,5] and Ole Hilberg[1,3]

[1]Pulmonary Research Unit (PLUZ), Department of Medicine, Zealand University Hospital Roskilde and Naestved, Naestved Hospital, Naestved, Denmark, [2]Department of Regional Health Research, Faculty of Health Sciences, University of Southern Denmark, Odense, Denmark, [3]Department of Medicine, Lillebaelt Hospital, Vejle, Denmark, [4]Department of Cardiothoracic and Vascular Surgery, Odense University Hospital, Odense, Denmark, [5]Danish Lung Cancer Registry, Odense, Denmark

Background: Surgical resection is the preferred treatment for localised non-small cell lung cancer (NSCLC). Rehabilitation is central in the management of the associated impaired quality of life, high symptom burden, deconditioning, and social-existential vulnerability. Yet, optimal content and delivery of rehabilitation are not yet defined. Therefore, we aimed to investigate the current rehabilitation offers, attendance rate, and perceived relevance related to content or delivery. Moreover, we investigated the current symptom burden in the patients.
Methods: We conducted an observational cohort study in patients who had undergone surgical resection for NSCLC 4–6 months earlier at Odense University Hospital, Denmark. We retrieved demographic data from patient registries, and interviewed patients via telephone concerning availability, uptake, and attendance rate of any rehabilitation offer in their local primary care setting; content and delivery; benefits of attending, experienced relevance and "symptom burden generally" (specially developed questions); and "symptom burden here and now" [Edmonton Symptom Assessment Scale (ESAS)].
Results: We approached 128 patients, reached 115, and interviewed the 100 (87%) patients who consented. In total, 88% (88/100) had received a rehabilitation offer, and 75% (66/88) had participated in programmes that either targeted NSCLC (23%) or were general cancer rehabilitation (33%), pulmonary rehabilitation (12%), online (1%), or other (33%). Disease-specific rehabilitation was significantly related to the highest attendance rate and perception of relevance. High attendance (≥75%) was, moreover, significantly related to the offer being delivered by a physiotherapist and having a focus on physical exercise. General symptoms were physically oriented [dyspnoea (65%), pain (47%), fatigue (78%)] and "mild" in ESAS scoring. No differences were observed in any baseline characteristics.
Conclusions: Rehabilitation after surgical resection for localised NSCLC is delivered heterogeneously in Denmark. Disease-specific rehabilitation was positively related to attendance rate and to the perceived relevance of the offer.

KEYWORDS
rehabilitation, lung cancer, attendance rate, exercise training, quality of life, symptom burden

Forberedelse 1: Kortlægningsstudie:

"Attendance rate and perceived relevance related to type, content, and delivery of current rehabilitation programmes after surgical resection for non-small cell lung cancer"

Aims:

- Investigate the current rehabilitation offers, attendance rate, and perceived relevance related to content or delivery.
- Investigate current symptom burden.

Kaasgaard M, Bodtger U, Løkke A, Jakobsen E, Hilberg O. Attendance rate and perceived relevance related to type, content, and delivery of current rehabilitation programmes after surgical resection for non-small cell lung cancer. Front Rehabil Sci. 2024 Dec 10;5:1447767. doi: 10.3389/fresc.2024.1447767.

NSCLC-kirurgi

- Hjerte- Lunge- og Karkirurgisk Afdeling T, OUH, for 4-6 måneder siden

Henvist fra/i kontrolforløb hos

- Sygehus Lillebælt, Vejle
- Sjællands Universitetshospital, Roskilde og Næstved

Inkluderet (februar –marts 2024)

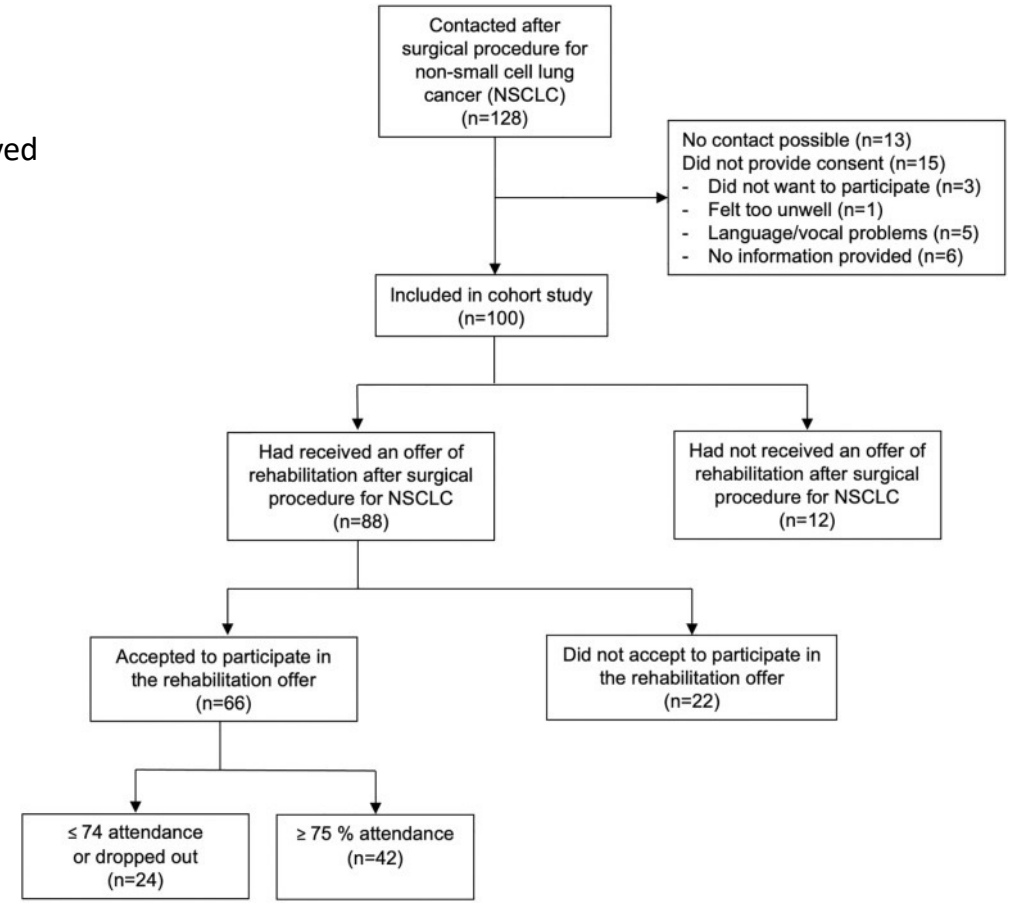
- N=100
- N=88 havde modtaget tilbud om rehabilitering
- N=66 havde deltaget I rehabilitering
- N=42 havde ≥75% fremmøde

Registerdata

- DLCR
- Patientjournaler

Telefoninterviews

- Spørgeskemaer om rehabilitering
- Symptombyrde (bl.a. ESAS)



Rehabilitering (n=66)

Tilbuddet var heterogent ift varighed, type og indhold

Type
- 23% målrettet NSCLC (23%)

Indhold
- Cardio (80%)
- Strength (77%)
- Breathing exercises (50%)

Træner
- Oftest fysioterapeut (92%)

Oplevet belastning
- Passende (79%)

TABLE 2A

Characteristics of the rehabilitation offer in participators

	n=66 Participators
Type of rehabilitation offer	
Special offer for lung cancer	15 (23%)
Cancer rehabilitation	22 (33%)
Pulmonary rehabilitation	8 (12%)
Online	1 (2%)
Other (at home with physiotherapist, other tra	22 (33%)
Delivery and intensity	
Which things were included in the training?	
Fitness/cardio training	53 (80%)
Strength training	51 (77%)
Exercises/training for breathing	33 (50%)
Which trainer was responsible for the physical training?	
Physiotherapist	61 (92%)
Occupational therapist	2 (3%)
Nurse	9 (14%)
Other (instruction in self-training)	1 (3%)
How hard do you think the physical training was? N=63, miss 3	
Too hard	3 (5%)
Adequate	50 (79%)
Too easy	4 (6%)
Do not know	6 (10%)

Hvad var relateret til høj deltagelse (≥75% fremmøde)?

- High attendance (≥75%) significantly related to the offer being **delivered by a physiotherapist** and having a **focus on physical exercise**.
- **Disease-specific rehabilitation** significantly related to the highest attendance rate and perception of relevance.
- High attendance (≥75%) significantly related to **perceived less breathlessness and improved breathing control.**

Table 2: Characteristics in low vs high attendance in rehabilitation progrmmes (RP) after NSCLC surgery

	n=66		
	≤74% attendance or drop out n=24	≥75% attendance n=42	p-value for difference
Type, delivery and perceived intensity of the RP offer			
Which type of rehabilitation offer?			
Special offer for lung cancer	2 (8%)	13 (31%)	0.04
Cancer rehabilitation	8 (33%)	14 (33%)	1.00
Pulmonary rehabilitation	3 (12%)	5 (12%)	0.94
Online	0 (0%)	0 (0%)	1.00
Other (at home with physiotherapist, other training across diseases, not specified)	11 (46%)	11 (26%)	0.10
How hard do you think the physical training was?			
Too hard	3 (14%)	0 (0%)	<0.001
Just right	10 (48%)	40 (95%)	
Not hard enough	3 (14%)	1 (2%)	
Do not know	5 (24%)	1 (2%)	
Did the training take place in a group or individually?			
In a group	12 (50%)	27 (64%)	0.26
Individually	9 (38%)	19 (45%)	0.54
Do not know	3 (12%)	0 (0%)	0.02
If you participated in a group, to what extent did you feel you matched well with the group?			
To a high degree	5 (13%)	19 (49%)	0.23
In between	2 (5%)	5 (13%)	
Not at all	4 (10%)	3 (8%)	
Do not know	1 (3%)	0 (0%)	
If you did NOT feel you matched with the group, what was the primary reason? (multiple answers possible)			
The others were much older than me	2 (8%)	2 (5%)	0.56
The others were much younger than me	0 (0%)	0 (0%)	.
The others were in better shape than me	0 (0%)	0 (0%)	.
The others were in worse shape than me	3 (12%)	1 (2%)	0.09
Our challenges/issues were too different	5 (21%)	2 (5%)	0.04
Other (not as sick as others, training at too low a level, got more sick from seeing the others)	4 (17%)	0 (0%)	0.01
Satisfaction and perceived benefits of the RP offer			
Do you feel that you have benefited from participating?			
Yes	10 (50%)	37 (88%)	<0.01
No	7 (35%)	3 (7%)	
Do not know	7 (35%)	2 (5%)	
Which improvements have you experienced from participating? (multiple answers possible)			
Gotten in better shape	9 (38%)	27 (64%)	0.04
Increased physical strength	8 (33%)	24 (57%)	0.06
Fewer pains	2 (8%)	0 (0%)	0.06
Less breathlessness	1 (4%)	16 (38%)	<0.01
Better control over my breathing	2 (8%)	17 (40%)	<0.01
Knowledge about my body, my disease, and my symptoms	1 (4%)	4 (10%)	0.43
More courage to face everything	4 (17%)	16 (38%)	0.07
Social community / being with like-minded people	0 (0%)	8 (19%)	0.02
Overall, have had fewer symptoms	2 (8%)	5 (12%)	0.65
Other (become happier, can walk longer, more motivated)	1 (4%)	3 (7%)	0.63
Did not experience any improvements	2 (8%)	2 (5%)	0.56

Symptombyrde

General symptoms were physically-oriented

- Dyspnoea (65%)
- Pain (47%)
- Fatigue (78%)

		n=100
Symptom burden		
Symptoms after surgical preocedure - have you experienced prominent problems? (yes)		
	Breathing-related symptoms/dyspnoea	65 (65%)
	Pain	47 (47%)
	Fatigue	78 (78%)
	Stiffness/tightness in the chest	29 (29%)
	Notice my body's signals all the time	74 (74%)
	Concerns about the future	40 (40%)
	Depressive symptoms	35 (35%)
	Feelings of anxiety and restlessness	29 (29%)
	Feeling of being alone/lonely/isolated	13 (13%)
	Voice problems	27 (27%)

Konklusion

- Rehabiliteringstilbuddet efter NSCLC-kirurgi er heterogent
- Densiteten af patienter fordelt pr. kommune er lavt
- Der et behov for at addressere de sygdomsspecifikke udfordringer og symptomer efter operation for lungekræft
- Dog: ikke muligt at gennemføre et nyt RCT i rammerne af kommunal rehabilitering.

frontiers | Frontiers in Rehabilitation Sciences

TYPE Original Research
PUBLISHED 10 December 2024
DOI 10.3389/fresc.2024.1447767

Check for updates

OPEN ACCESS

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RECEIVED 12 June 2024
ACCEPTED 05 November 2024
PUBLISHED 10 December 2024

CITATION
Kaasgaard M, Bodtger U, Løkke A, Jakobsen E and Hilberg O (2024) Attendance rate and perceived relevance related to type, content, and delivery of current rehabilitation programmes after surgical resection for non-small cell lung cancer
Front. Rehabil. Sci. 5:1447767.
doi: 10.3389/fresc.2024.1447767

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Attendance rate and perceived relevance related to type, content, and delivery of current rehabilitation programmes after surgical resection for non-small cell lung cancer

Mette Kaasgaard[1,2]*, Uffe Bodtger[3,4], Anders Løkke[1,3], Erik Jakobsen[4,5] and Ole Hilberg[3,5]

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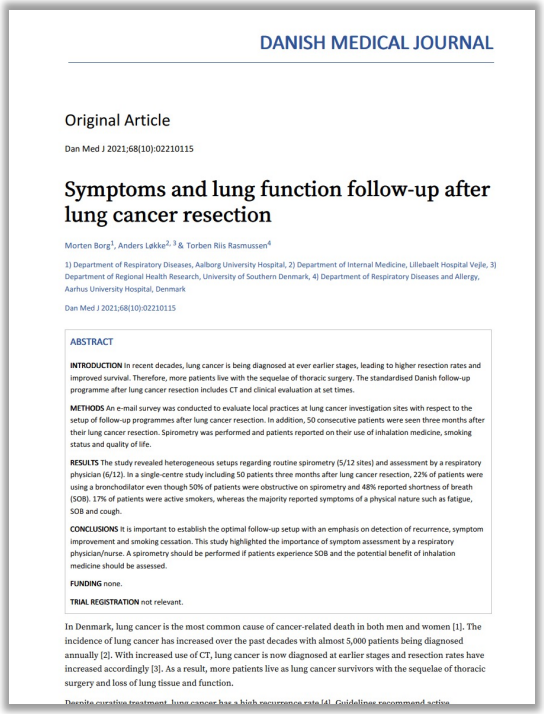
Background: Surgical resection is the preferred treatment for localised non-small cell lung cancer (NSCLC). Rehabilitation is central in the management of the associated impaired quality of life, high symptom burden, deconditioning, and social-existential vulnerability. Yet, optimal content and delivery of rehabilitation are not yet defined. Therefore, we aimed to investigate the current rehabilitation offers, attendance rate, and perceived relevance related to content or delivery. Moreover, we investigated the current symptom burden in the patients.
Methods: We conducted an observational cohort study in patients who had undergone surgical resection for NSCLC 4–6 months earlier at Odense University Hospital, Denmark. We retrieved demographic data from patient registries, and interviewed patients via telephone concerning availability, uptake, and attendance rate of any rehabilitation offer in their local primary care setting; content and delivery; benefits of attending, experienced relevance and "symptom burden generally" (specially developed questions); and "symptom burden here and now" (Edmonton Symptom Assessment Scale (ESAS)).
Results: We approached 128 patients, reached 115, and interviewed the 100 (87%) patients who consented. In total, 88% (88/100) had received a rehabilitation offer, and 75% (66/88) had participated in programmes that either targeted NSCLC (23%) or were general cancer rehabilitation (53%), pulmonary rehabilitation (12%), online (1%), or other (33%). Disease-specific rehabilitation was significantly related to the highest attendance rate and perception of relevance. High attendance (≥75%) was, moreover, significantly related to the offer being delivered by a physiotherapist and having a focus on physical exercise. General symptoms were physically oriented (dyspnoea (65%), pain (47%), fatigue (78%)) and "mild" in ESAS scoring. No differences were observed in any baseline characteristics.
Conclusions: Rehabilitation after surgical resection for localised NSCLC is delivered heterogeneously in Denmark. Disease-specific rehabilitation was positively related to attendance rate and to the perceived relevance of the offer.

KEYWORDS
rehabilitation, lung cancer, attendance rate, exercise training, quality of life, symptom burden

Kaasgaard M, Bodtger U, Løkke A, Jakobsen E, Hilberg O. Attendance rate and perceived relevance related to type, content, and delivery of current rehabilitation programmes after surgical resection for non-small cell lung cancer. Front Rehabil Sci. 2024 Dec 10;5:1447767. doi: 10.3389/fresc.2024.1447767.

Tidligere danske studier har ligeledes peget på, at en betragtelig del af patienter har nedsat livskvalitet og betydende symptombyrde - herunder ikke mindst dyspnø – samt at dette niveau ikke rigtig forandrer sig over tid.



DANISH MEDICAL JOURNAL

Original Article

Dan Med J 2021;68(10):02210115

Symptoms and lung function follow-up after lung cancer resection

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Dan Med J 2021;68(10):02210115

ABSTRACT

INTRODUCTION In recent decades, lung cancer is being diagnosed at ever earlier stages, leading to higher resection rates and improved survival. Therefore, more patients live with the sequelae of thoracic surgery. The standardised Danish follow-up programme after lung cancer resection includes CT and clinical evaluation at set times.

METHODS An e-mail survey was conducted to evaluate local practices at lung cancer investigation sites with respect to the setup of follow-up programmes after lung cancer resection. In addition, 50 consecutive patients were seen three months after their lung cancer resection. Spirometry was performed and patients reported on their use of inhalation medicine, smoking status and quality of life.

RESULTS The study revealed heterogeneous setups regarding routine spirometry (5/12 sites) and assessment by a respiratory physician (6/12). In a single-centre study including 50 patients three months after lung cancer resection, 22% of patients were using a bronchodilator even though 50% of patients were obstructive on spirometry and 48% reported shortness of breath (SOB). 17% of patients were active smokers, whereas the majority reported symptoms of a physical nature such as fatigue, SOB and cough.

CONCLUSIONS It is important to establish the optimal follow-up setup with an emphasis on detection of recurrence, symptom improvement and smoking cessation. This study highlighted the importance of symptom assessment by a respiratory physician/nurse. A spirometry should be performed if patients experience SOB and the potential benefit of inhalation medicine should be assessed.

FUNDING none.

TRIAL REGISTRATION not relevant.

In Denmark, lung cancer is the most common cause of cancer-related death in both men and women [1]. The incidence of lung cancer has increased over the past decades with almost 5,000 patients being diagnosed annually [2]. With increased use of CT, lung cancer is now diagnosed at earlier stages and resection rates have increased accordingly [3]. As a result, more patients live as lung cancer survivors with the sequelae of thoracic surgery and loss of lung tissue and function.

Despite curative treatment, lung cancer has a high recurrence rate [4]. Guidelines recommend active

Articles

Postoperative pain and quality of life after lobectomy via video-assisted thoracoscopic surgery or anterolateral thoracotomy for early stage lung cancer: a randomised controlled trial

Morten Bendixen, Ole Dan Jørgensen, Christian Kronborg, Claus Andersen, Peter Bjørn Licht

Lancet Oncol 2016; 17: 836–44

Published Online May 5, 2016 http://dx.doi.org/10.1016/S1470-2045(16)00173-X

See Comment page 699

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Summary

Background Video-assisted thoracoscopic surgery (VATS) is used increasingly as an alternative to thoracotomy for lobectomy in the treatment of early-stage non-small-cell lung cancer, but remains controversial and worldwide adoption rates are low. Non-randomised studies have suggested that VATS reduces postoperative morbidity, but there is little high-quality evidence to show its superiority over open surgery. We aimed to investigate postoperative pain and quality of life in a randomised trial of patients with early-stage non-small-cell lung cancer undergoing VATS versus open surgery.

Methods We did a randomised controlled patient and observer blinded trial at a public university-based cardiothoracic surgery department in Denmark. We enrolled patients who were scheduled for lobectomy for stage I non-small-cell lung cancer. By use of a web-based randomisation system, we assigned patients (1:1) to lobectomy via four-port VATS or anterolateral thoracotomy. After surgery, we applied identical surgical dressings to ensure masking of patients and staff. Postoperative pain was measured with a numeric rating scale (NRS) six times per day during hospital stay and once at 2, 4, 8, 12, 26, and 52 weeks, and self-reported quality of life was assessed with the EuroQol 5 Dimensions (EQ5D) and the European Organisation for Research and Treatment of Cancer (EORTC) 30 item Quality of Life Questionnaire (QLQ-C30) during hospital stay and 2, 4, 8, 12, 26, and 52 weeks after discharge. The primary outcomes were the proportion of patients with clinically relevant moderate-to-severe pain (NRS ≥3) and mean quality of life scores. These outcomes were assessed longitudinally by logistic regression across all timepoints. Data for the primary analysis were analysed by modified intention to treat (ie, all randomised patients with pathologically confirmed non-small-cell lung cancer). This trial is registered with ClinicalTrials.gov, number NCT01278888.

Findings Between Oct 1, 2008, and Aug 20, 2014, we screened 772 patients, of whom 361 were eligible for inclusion and 206 were enrolled. We randomly assigned 103 patients to VATS and 103 to anterolateral thoracotomy. 102 patients in the VATS group and 99 in the thoracotomy group were included in the final analysis. The proportion of patients with clinically relevant pain (NRS ≥3) was significantly lower during the first 24 h after VATS than after anterolateral thoracotomy (VATS 38%, 95% CI 0·28–0·48 *vs* thoracotomy 65%, 95% CI 0·52–0·72, p=0·0012). During 52 weeks of follow-up, episodes of moderate-to-severe pain were significantly less frequent after VATS than after anterolateral thoracotomy (p<0·0001) and self-reported quality of life according to EQ5D was significantly better after VATS (p=0·014). By contrast, for the whole study period, quality of life according to QLQ-C30 was not significantly different between groups (p=0·13). Postoperative surgical complications (grade 3–4 adverse events) were similar between the two groups, consisting of prolonged air leakage over 4 days (14 patients in the VATS group *vs* nine patients in the thoracotomy group), re-operation for bleeding (two *vs* none), twisted middle lobe (one *vs* three) or prolonged air leakage over 7 days (five *vs* six), arrhythmia (one *vs* one), or neurological events (one *vs* two). Nine (4%) patients died during the follow-up period (three in the VATS group and six in the thoracotomy group).

Interpretation VATS is associated with less postoperative pain and better quality of life than is anterolateral thoracotomy for the first year after surgery, suggesting that VATS should be the preferred surgical approach for lobectomy in stage I non-small-cell lung cancer.

Funding Simon Fougner Hartmanns Familiefond, Guldsmed AL & D Rasmussens Mindefond, Karen S Jensens legat, The University of Southern Denmark, The Research Council at Odense University Hospital, and Department of Cardiothoracic Surgery, Odense University Hospital.

Introduction

Complete surgical resection remains the gold standard for curative treatment of early stage non-small-cell lung cancer in patients who are physiologically fit. Traditionally, resection is done via a thoracotomy, but during the past two decades, video-assisted thoracoscopic surgery (VATS) has emerged as a minimally invasive alternative for advanced resections, including lobectomy.

Borg M, Løkke A, Rasmussen TR. Symptoms and lung function follow-up after lung cancer resection. Dan Med J. 2021 Sep 15;68(10):A02210115. PMID: 34558410.

Bendixen M, Jørgensen OD, Kronborg C, Andersen C, Licht PB. Postoperative pain and quality of life after lobectomy via video-assisted thoracoscopic surgery or anterolateral thoracotomy for early stage lung cancer: a randomised controlled trial. Lancet Oncol. 2016 Jun;17(6):836-844. doi: 10.1016/S1470-2045(16)00173-X

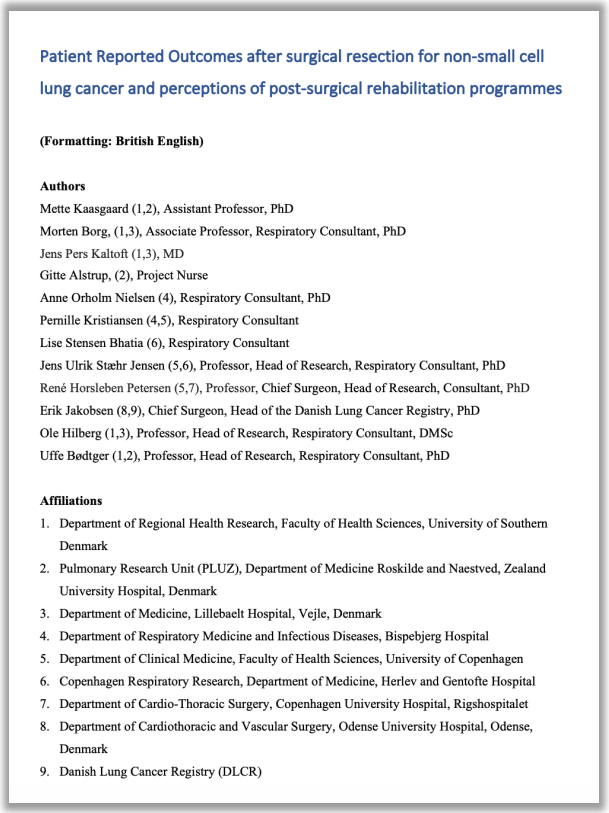
Forberedelse 2: Tværsnitsstudie

Patient Reported Outcomes after surgical resection for non-small cell lung cabcer and perceptions of post-surgical rehabilitation programmes

Aims:

- Investigate status of QoL and prevalence, type, and level of symptom burden in patients 6-12 months after curative intended surgery for NSCLC.

- Explore patient-reported characteristics (type, content, and delivery) and perceived satisfaction and benefits from any participation in a rehabilitation programme following NSCLC surgery.



Patient Reported Outcomes after surgical resection for non-small cell lung cancer and perceptions of post-surgical rehabilitation programmes

(Formatting: British English)

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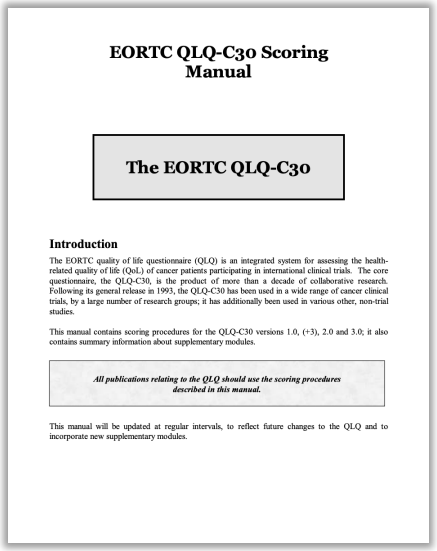
9. Danish Lung Cancer Registry (DLCR)

Mette Kaasgaard, Morten Borg, Jens Pers Kaltoft, Gitte Alstrup, Anne Orholm, Pernille Kristiansen, Lise Stensen Bhatia, Jens Ulrik Stæhr Jensen, Erik Jakobsen, Rene Horsleben Petersen, Ole Hilberg, Uffe Bødtger. Patient-Reported Outcomes after surgical resection for non-small cell lung cancer and perceptions of post-surgical rehabilitation programmes. 2026. BMJ Open Respiratory Research. DOI: 10.1136/bmjresp-2025-003865

The European Organisation for Research and Treatment of Cancer questionnaire (EORTC QLQ-C30) (v. 3.0)

Functional QoL across six domains: Physical function, role functioning, emotional function, cognitive function, and social function.

Symptom burden across nine domains: Fatigue, nausea and vomiting, pain, insomnia, dyspnoea, appetite loss, constipation, diarrhea, and financial concerns.


EORTC QLQ-C30 Scoring Manual

EORTC QLQ-C30 Scoring Manual

The EORTC QLQ-C30

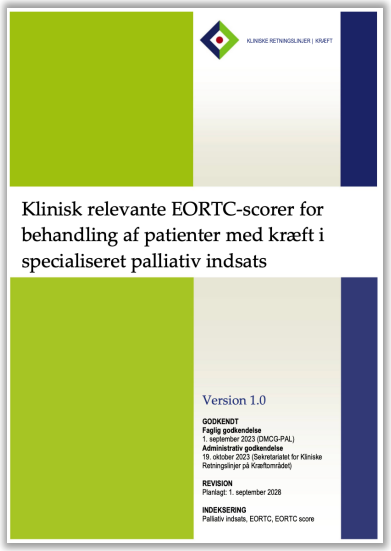
Introduction

The EORTC quality of life questionnaire (QLQ) is an integrated system for assessing the health-related quality of life (QoL) of cancer patients participating in international clinical trials. The core questionnaire, the QLQ-C30, is the product of more than a decade of collaborative research. Following its general release in 1993, the QLQ-C30 has been used in a wide range of cancer clinical trials, by a large number of research groups; it has additionally been used in various other, non-trial studies.

This manual contains scoring procedures for the QLQ-C30 versions 1.0, (+3), 2.0 and 3.0; it also contains summary information about supplementary modules.

All publications relating to the QLQ should use the scoring procedures described in this manual.

This manual will be updated at regular intervals, to reflect future changes to the QLQ and to incorporate new supplementary modules.


DMCG, 2023

KLINISKE RETNINGSLINJER | KRÆFT

Klinisk relevante EORTC-scorer for behandling af patienter med kræft i specialiseret palliativ indsats

Version 1.0

GODKENDT
Faglig godkendelse
1. september 2023 (DMCG-PAL)
Administrativ godkendelse
19. oktober 2023 (Sekretariatet for Kliniske Retningslinjer på Kræftområdet)

REVISION
Planlagt 1. september 2028

INDEKSERING
Palliativ indsats, EORTC, EORTC score


Giesinger, et al., 2020

ELSEVIER

Journal of Clinical Epidemiology

Journal of Clinical Epidemiology 118 (2020) 1–8

ORIGINAL ARTICLE

Thresholds for clinical importance were established to improve interpretation of the EORTC QLQ-C30 in clinical practice and research

Johannes M. Giesinger, Fanny L.C. Loth, Neil K. Aaronson, Juan I. Arraras, Giovanni Caocci, Fabio Efficace, Mogens Groenvold, Marieke van Leeuwen, Morten Aa. Petersen, John Ramage, Krzysztof A. Tomaszewski, Teresa Young, Bernhard Holzner, on behalf of the EORTC Quality of Life Group

Accepted 16 October 2019; Published online 19 October 2019

Abstract

Objective: The objective of this study was to establish thresholds for clinical importance (TCIs) for the five functioning and nine symptom scales of the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30).

Study Design and Setting: In this diagnostic study, cancer patients with mixed diagnoses and treatments completed the EORTC QLQ-C30 and anchored the questions in each domain in terms of their clinical importance. The anchor questions, concerned limitations in daily life, need for helpcare, and the worries of the patient and his/her partner/family. These questions allowed categorizing patients into whether they exhibited a clinically important symptom/functional impairment for each scale and performing a receiver operating characteristic curve analysis to establish TCIs.

Results: Data from 498 patients from six European countries (mean age 60.4 years, 55.2% women) were analyzed. For the TCIs generated using the patient questionnaire data, the EORTC QLQ-C30 scales showed sensitivity values between 0.71 and 0.97 and specificity values between 0.62 and 0.92 (area under the curve above 0.80 for all scales).

Conclusion: This EORTC Quality of Life Group study provides TCIs for the functioning and symptom scales of the EORTC QLQ-C30. These TCIs can increase the interpretability of the questionnaire results and foster its use in daily clinical practice and in clinical research. © 2019 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Keywords: Quality of life; Clinical oncology; Patient-reported outcome measures; EORTC QLQ-C30; Clinical significance; Thresholds; Cut-offs

1. Background

The European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30) [1] is one of the most widely used patient-reported outcome (PRO) questionnaires for assessing quality of life (QOL), functional health, and symptom burden in patients with cancer worldwide [2]. Historically, it has served as an outcome measure in cancer clinical trials,

NSCLC-kirurgi for 6-12 mdr siden

- Hjerte- Lunge- og Karkirurgisk Afdeling T, OUH
- Afdeling for Hjerte- og Lungekirurgi, Rigshospitalet

Henvist til operation fra - og i kontrolforløb hos -

- Sygehus Lillebælt, Vejle
- Sjællands Universitetshospital, Roskilde og Næstved

Inkluderet (marts til juni 2025)

- N= 168 blev identificeret
- N= 94 (56% ud af 168) blev kontaktet
- N= 67 (71% ud af 94) besvarede spørgeskemaet
- N= 36 (54%) angav at have deltaget i rehabilitation efter operation

Survey (link via e-boks)

- Livskvalitet og symptomer (EORTC QLQ-C30)
- Spørgeskemaer om rehabilitering
- (Spørgeskema om interesse for sang)

Registerdata

- DLCR
- Patientjournaler

Table 1: Characteristics of the study cohort: Patients 6-12 months after NSCLC surgery

	Overall cohort n=94			
	Overall cohort n=94	Responders n=67	Non-responders n=27	p-value for between-group difference
Referring hospital				<0.001
Zealand University Hostpial, Denmark	71 (76%)	59 (88%)	12 (44%)	
Hospital Lillebaelt, Vejle, Denmark	23 (25%)	8 (12%)	15 (56%)	
Age (at time of surgery)	70.2 (8.5)	71.4 (8.0)	67.4 (9.2)	0.04
Sex, female	58 (62%)	42 (63%)	16 (59%)	0.76
Smoking status				0.11
Current smoker	28 (30%)	16 (24%)	12 (44%)	
Former smoker	56 (60%)	42 (64%)	14 (52%)	
Never smoker	9 (10%)	8 (12%)	1 (4%)	
Previously had surgery for NSCLC	4 (4%)	2 (3%)	2 (7%)	0.34
Time since surgical procedure (months)	8.9 (1.8)	9.1 (1.9)	8.3 (1.4)	0.07
Surgery classification				0.91
Lobectomy	78 (83%)	55 (82%)	23 (85%)	
Segmentectomy	3 (3%)	2 (3%)	1 (4%)	
Wedge Resection	12 (13%)	9 (13%)	3 (11%)	
Bilobectomy	1 (1%)	1 (2%)	0 (0%)	
Pre-surgical FEV1 % predicted	85.8 (21.3)	85.2 (21.4)	87.2 (21.4)	0.70
Pre-surgical DLCO % predicted	69.3 (18.5)	70.2 (18.8)	66.9 (17.9)	0.43
Risk factors pre- surgery (retrieved from The Danish Lung Cancer Registry)				
COPD	32 (34%)	22 (33%)	10 (37%)	0.70
Cardiac disease	8 (9%)	5 (8%)	3 (11%)	0.57
Other disease	21 (22%)	14 (21%)	7 (26%)	0.60

Table 2: Quality of life and symptoms 6-12 months after NSCLC surgery: Raw and transformed EORTC QLQ-C30 scores and proportion of patients with impaired levels

Most commonly impaired functional component

- Physical functioning: 34 (51%)

Most commonly impaired symptoms

- Dyspnoea: 47 (70%)
- Fatigue: 37 (55%)
- Sleep disturbances: 36 (54%)

	Survey completers n=67				
		Based on raw QLQ-C30 scores		Based on transformed QLQ-C30 scores	
	Raw QLQ-C30 scores	Proportion with a clinically relevant symptom or problem (DMCG, 2023)	Proportion with a severe/serious symptom or problem (DMCG, 2023)	Tranformed QLQ-C30 scores	Proportion with a clinically relevant symptom or problem (Giesinger, 2020)
	mean (SD)	n (%)	n (%)	mean (SD)	n (%)
EORTC QLQ-C30 - Functional scale					
Physical Functioning	1.7 (0.6)	N/A	N/A	77.6 (19.9)	34 (51%)
Role Functioning	1.7 (0.8)	N/A	N/A	77.4 (26.4)	10 (15%)
Emotional Functioning	1.6 (0.6)	N/A	N/A	80.3 (20.67)	19 (28%)
Cognitive Functioning	1.5 (0.6)	N/A	N/A	84.1 (20.2)	14 (21%)
Social Functioning	2.6 (1.1)	N/A	N/A	90.3 (18.8)	5 (8%)
EORTC QLQ-C30 - Symptom scale					
Fatigue	1.9 (0.8)	10 (15%)	37 (55%)	31.3 (25.7)	21 (31%)
Nausea/Vomiting	1.2 (0.5)	5 (8%)	5 (8%)	6.0 (16.2)	15 (22%)
Pain	1.4 (0.5)	13 (19%)	13 (19%)	12.1 (17.9)	13 (19%)
Sleep Disturbances	1.8 (0.9)	12 (18%)	36 (54%)	25.4 (28.5)	12 (18%)
Dyspnoea	2.0 (0.9)	47 (70%)	47 (70%)	34.8 (30.1)	47 (70%)
Appetite Loss	1.4 (0.8)	8 (12%)	17 (25%)	13.9 (27.3)	8 (12%)
Constipation	1.3 (0.6)	6 (9%)	13 (19%)	9.1 (21.5)	6 (9%)
Diarrhea	1.3 (0.7)	6 (9%)	14 (21%)	10.45 (22.6)	14 (21%)
Financial Impact	1.1 (0.4)	1 (2%)	6 (9%)	3.9 (14.8)	6 (9%)

Table 3: Characteristics and quality of life and symptoms status related to impaired physical functioning and dyspnoea in patients 6-12 months after NSCLC surgery

	Physical functioning (Responders n=67)			Dyspnoea (Responders n=67)		
	Clinically impaired	Not clinically impaired	p-value for between-group difference	Clinically impaired	Not clinically impaired	p-value for between-group difference
	n=34 (51%)	n=33 (49%)		n=47 (70%)	n=20 (30%)	
Age (at time of surgery)	71.4 (8.0)	70.9 (8.2)	0.63	71.9 (7.6)	70.0 (9.1)	0.37
Sex, female	22 (65%)	20 (61%)	0.73	30 (64%)	12 (60%)	0.77
Time since surgical procedure (months)	9.1 (1.7)	9.0 (2.0)	0.85	9.3 (1.8)	8.6 (2.1)	0.18
Pre-surgical FEV1 % predicted	80.9 (20.2)	89.8 (22.0)	0.09	83.7 (21.7)	88.8 (20.9)	0.38
Pre-surgical DLCO % predicted	62.1 (15.1)	78.4 (18.8)	<0.001	68.9 (17.7)	73.4 (21.3)	0.37
Rehabilitation attendance	22 (65%)	14 (42%)	0.07	31 (67%)	5 (25%)	0.002
Quality of life and symptoms - EORTC QLQ-C30						
Functioning scales - Proportion with a clinically relevant symptom or problem (Giesinger, 2020)						
Physical Functioning	(.)	(.)	(.)	30 (64%)	4 (20%)	0.001
Role Functioning	9 (27%)	1 (3%)	0.01	10 (21%)	0 (0%)	0.03
Emotional Functioning	12 (35%)	7 (21%)	0.20	15 (32%)	4 (20%)	0.32
Cognitive Functioning	7 (21%)	7 (21%)	0.95	13 (28%)	1 (5%)	0.04
Social Functioning	5 (15%)	0 (0%)	0.02	5 (11%)	0 (0%)	0.13
Symptom scales - Proportion with a clinically relevant symptom or problem (Giesinger, 2020)						
Fatigue	18 (53%)	3 (9%)	<0.001	20 (43%)	1 (5%)	<0.01
Nausea/Vomiting	11 (32%)	4 (12%)	0.047	12 (26%)	3 (15%)	0.34
Pain	13 (38%)	0 (0%)	<0.001	13 (28%)	0 (0%)	<0.01
Sleep Disturbances	8 (24%)	4 (12%)	0.22	10 (21%)	2 (10%)	0.27
Dyspnoea	30 (88%)	17 (52%)	0.001	(.)	(.)	(.)
Appetite Loss	5 (15%)	3 (9%)	0.48	6 (13%)	2 (10%)	0.75
Constipation	5 (15%)	1 (3%)	0.09	5 (11%)	1 (5%)	0.46
Diarrhea	9 (27%)	5 (15%)	0.26	9 (19%)	5 (25%)	0.59
Financial Impact	4 (12%)	2 (6%)	0.41	5 (11%)	1 (5%)	0.46

Table 3: Characteristics and quality of life and symptoms status related to impaired physical functioning and dyspnoea in patients 6-12 months after NSCLC surgery

	Physical functioning (Responders n=67)			Dyspnoea (Responders n=67)		
	Clinically impaired	Not clinically impaired	p-value for between-group difference	Clinically impaired	Not clinically impaired	p-value for between group difference
	n=34 (51%)	n=33 (49%)		n=47 (70%)	n=20 (30%)	
Age (at time of surgery)	71.4 (8.0)	70.9 (8.2)	0.63	71.9 (7.6)	70.0 (9.1)	0.37
Sex, female	22 (65%)	20 (61%)	0.73	30 (64%)	12 (60%)	0.77
Time since surgical procedure (months)	9.1 (1.7)	9.0 (2.0)	0.85	9.3 (1.8)	8.6 (2.1)	0.18
Pre-surgical FEV1 % predicted	80.9 (20.2)	89.8 (22.0)	0.09	83.7 (21.7)	88.8 (20.9)	0.38
Pre-surgical DLCO % predicted	62.1 (15.1)	78.4 (18.8)	<0.001	68.9 (17.7)	73.4 (21.3)	0.37
Rehabilitation attendance	22 (65%)	14 (42%)	0.07	31 (67%)	5 (25%)	0.002
Quality of life and symptoms - EORTC QLQ-C30						
Functioning scales - Proportion with a clinically relevant symptom or problem (Giesinger, 2020)						
Physical Functioning	(.)	(.)	(.)	30 (64%)	4 (20%)	0.001
Role Functioning	9 (27%)	1 (3%)	0.01	10 (21%)	0 (0%)	0.03
Emotional Functioning	12 (35%)	7 (21%)	0.20	15 (32%)	4 (20%)	0.32
Cognitive Functioning	7 (21%)	7 (21%)	0.95	13 (28%)	1 (5%)	0.04
Social Functioning	5 (15%)	0 (0%)	0.02	5 (11%)	0 (0%)	0.13
Symptom scales - Proportion with a clinically relevant symptom or problem (Giesinger, 2020)						
Fatigue	18 (53%)	3 (9%)	<0.001	20 (43%)	1 (5%)	<0.01
Nausea/Vomiting	11 (32%)	4 (12%)	0.047	12 (26%)	3 (15%)	0.34
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Sleep Disturbances	8 (24%)	4 (12%)	0.22	10 (21%)	2 (10%)	0.27
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Financial Impact	4 (12%)	2 (6%)	0.41	5 (11%)	1 (5%)	0.46

Rehabilitation - type, adherence, and dropout

Participation
- N=36 (54% out of overall cohort)

Type
- Mixed cancer rehabilitation: 15 (42%)
- Pulmonary rehabilitation: 13 (36%)

Adherence
- >75%: 30 (84%)

Dropout
- 6 (17%)

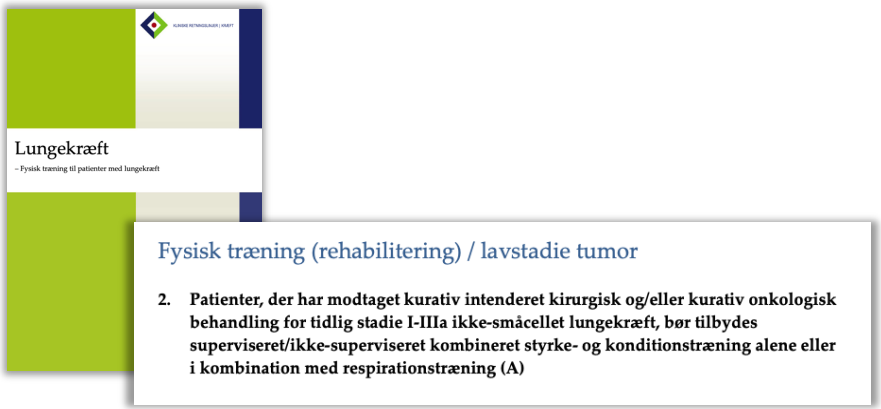
	Have attended a rehabilitation programme
	n=36 (54% of overall cohort))
Setting of rehabilitation programme	
Municipal healthcare center	33 (92%)
Hospital	0 (0%)
Home with exercise guidance	3 (8%)
Online	0 (0%)
Type of rehabilitation programme	
Pulmonary rehabilitation	13 (36%)
Cancer rehabilitation (mixed cancer rehabilitation)	15 (42%)
Other	6 (17%)
Uncertain	2 (5%)
Duration of rehabilitation programme	
Less than four weeks	3 (8%)
Between four and six weeks	3 (8%)
Between six and eight weeks	6 (17%)
More than eight weeks	24 (67%)
Share of rehabilitation programme attended	
The entire programme	25 (70%)
Around 75%	5 (14%)
Around 50%	3 (8%)
Less than 25%	3 (8%)
Dropout during rehabilitation programme	
Yes	6 (17%)

Content of the rehabilitation programmes

Content
- Physical training was included in all programmes

Perceived exertion
- Adequete

Recommended combined offer
- Strength and endurance training: 20 (30%)
- Strength, endurance, and respiratory training: 10 (15%)



	Have attended a rehabilitation programme
	n=36 (54% of overall cohort))
inclusion of physical exercise training	
Yes	36 (100%)
Patient-perspectives: Perception of exertion of the physical training	
Felt adequetely challenged	32 (89%)
Felt too challenged	3 (8%)
Didn't feel challenged enough	1 (3%)
Specific components in the physical exercise training (multiple choice, with detalied examples)	
Strength training, number and % out of 36	21 (58%)
Endurance training, number and % out of 36	31 (86%)
Stretching, number and % out of 36	13 (36%)
Respiratory training/breathing exercises, number and % out of 36	20 (56%)
Other, e.g. walking outside, yoga, gymnastics, number and % out of 36	8 (22%)
Compliance with guidelines on combined components in NSCLC rehabilitation	
Combined strength and endurance training	20 (30%)
Combined strength, endurance, and respiratory training/breathing exercises	10 (15%)

Perceived satisfaction with the rehabilitation programmes

The programme helped to get back on top after surgery

Overall satisfaction with the rehabilitation programme

	Have attended a rehabilitation programme
	n=36 (54% of overall cohort))
Patient-perspectives: The rehabilitation programme helped to get back on top after surgery	
Yes	23 (64%)
No	7 (19%)
Uncertain	6 (17%)
Patient-perspectives: Overall satisfaction with the rehabilitation programme	
Very satisfied	15 (42%)
Satisfied	9 (25%)
Neither/nor – in between	7 (19%)
Dissatisfied	2 (5%)
Very dissatsified	3 (8%)

Interest in a potential offer of singing

(not submitted)

74% har ikke tidligere erfaring med sang

Andel som tror at sang kan hjælpe på:

- Dyspnø: 44%
- Livskvalitet: 48%
- Følelser af bekymring: 31%

Barrierer:

Manglende overskud: 31%

Andet (transport, syg ægtefælle): 38%

Umiddelbar interesse:

Meget/lidt interesseret: 38%

Vil gerne kontaktes mhb på evt tilbud: 52%

	Study cohort n=64
Do you have experience with singing?	
Yes	15 (23%)
No	47 (74%)
Do not know/prefer not to answer	2 (3%)
Experience with singing in a local lung choir	
Yes	2 (3%)
No	60 (97%)
Do you think that singing as a form of exercise training might reduce your symptoms – overall?	
Yes	10 (16%)
No	22 (34%)
Do not know/prefer not to answer	32 (50%)
Which common symptoms do you think singing as a form of exercise training might be able to help with?	
Breathlessness	28 (44%)
Pain	3 (5%)
Fatigue	7 (11%)
Nausea	0 (0%)
Appetite	0 (0%)
Worry	20 (31%)
None	9 (14%)
Do not know/prefer not to answer	21 (33%)
Do you think singing as a form of exercise training will be able to improve some of these aspects?	
Physical fitness	9 (14%)
Physical strength	10 (16%)
Quality of life	31 (48%)
Symptoms of anxiety	9 (14%)
Symptoms of depression	8 (13%)
Other	0 (0%)
None (I don't think singing can help)	10 (16%)
Do not know/prefer not to answer	22 (34%)
If an offer were available with singing as a form of exercise training to improve your symptoms, how interested would you be in participating?	
Very interesetd	10 (16%)
A little interested	14 (22%)
Neither/nor – in between	7 (11%)
Not very interested	6 (10%)
Not at all interested	17 (27%)
Do not know/prefer not to answer	9 (14%)
Which aspects would potentially constitute an obstacle for you in relation to participating in an offer of singing as a form of exercise training?	
I am unable to attend due to work (can only attend after normal working hours)	5 (9%)
I don't have time to participate	2 (3%)
I'm too ill to participate	7 (12%)
I can't manage to participate	18 (31%)
I wouldn't want to participate	4 (7%)
Other reasons (husband is very ill, transportation issues, do not have a car)	22 (38%)
If such an offer existed, how far would you be willing to travel to be able to participate in singing as a form of exercise training twice a week for 10 weeks?	
Less than 5 km	13 (21%)
Between 5 and 10 km	8 (13%)
Between 10 and 20 km	8 (13%)
More than 20 km	1 (2%)
Do not know/prefer not to answer	32 (51%)
May we contact you later with information about an offer of singing as a form of training in case we set up a course in your local area?	
Yes, I am interested	33 (52%)
Concatct information provided, email	31 (48%)
Concatct information provided, telephone number	30 (47%)

Conclusion

- Functional QoL was clinically importantly impaired 6-12 months after NSCLC surgery: Physical function: 70%
- Clinically importantly impaired symptoms: Dyspnoea 70%; fatigue: 55%; sleep disturbances: 54%

- Rehabilitation after surgical resection for localised NSCLC is delivered heterogeneously in Denmark
- Findings are in line with previous studies
- Need for disease-specific offer which addresses persistent challenges after NSCLC-surgery

For the planned RCT:

- Density of patient is low
- Transportation is a barrier
- Singing may address e.g. dyspnoea

- Online delivery of singing has been feasible and well-accepted [1-3]

1. Philip KEJ, et al. Singing for lung health in COPD: a multicentre randomised controlled trial of online delivery. *BMJ Open Respiratory Research*. 2024;11:e002365. https://doi.org/10.1136/bmjresp-2024-002365
2. Lewis A, et al. Singing for lung health following completion of pulmonary rehabilitation: feasibility of a randomised controlled trial. *BMJ Open Respiratory Research*. 2026;13:e003236. https://doi.org/10.1136/bmjresp-2025-003236
3. Smallwood N, et al. The SINFONIA study: a phase III randomised controlled trial of an online group singing intervention for people with COPD or ILD. European Respiratory Journal 2025 66(suppl 69): RCT2291; DOI: https://doi.org/10.1183/13993003.congress-2025.RCT2291

Effects and mechanisms of online delivered singing training (Singing for Lung Health) vs usual care in patients with persistent symptoms 6-18 months after surgical resection for non-small cell lung cancer (NSCLC) – a multi-centre cross-over randomised controlled trial

Version 1.4 - Date: 07-10-2025 –marked version

Bilag 3: Forsøgsprotokol

De Regionale Videnskabetiske Komitéer – Region Sjælland
Oprindeligt anmeldelsesnummer: 97831
Godkendelsesnummer SJ-1027 (dateret 18. August 2023)
Nyt anmeldelsesnummer: 119224

Effects and mechanisms of online delivered singing training (Singing for Lung Health) vs usual care in patients with persistent symptoms 6-18 months after surgical resection for non-small cell lung cancer (NSCLC) – a multi-centre cross-over randomised controlled trial

Research group

Principal investigator
Mette Kaasgaard, Assistant Professor, PhD, MSc, classical singer and singing pedagogue
Email: mkaasgaard@health.sdu.dk

Primary institutional and academic affiliations, and research group members
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Respiratory Research Unit, Department of Medicine, Lillebaelt Hospital, Vejle, Denmark
Morten Hornemann Borg, Associate Professor, respiratory consultant, head of "Lungeakken" at Lillebaelt Hospital, PhD
Ole Hilberg, Professor, head of research, respiratory consultant, DMSc

Respiratory Research Unit (ODIN), Department of Respiratory Medicine
Department of Clinical Medicine
Faculty of Health Sciences, University of Southern Denmark
Christian Borbjerg Laursen, head of research, Professor, respiratory consultant, PhD

Department of Respiratory Medicine, Bispebjerg Hospital
Department of Clinical Medicine, Faculty of Health Sciences, Copenhagen University
Pernille Kristiansen, respiratory consultant.
Anne Orholm, respiratory consultant, PhD

Effects and mechanisms of online delivered singing training (Singing for Lung Health) vs usual care in patients with persistent symptoms 6-18 months after surgical resection for non-small cell lung cancer (NSCLC) – a multi-centre cross-over randomised controlled trial

Aims:

- Effekt af sang vs usual care 6-18 mdr efter NSCLC-kirurgi
- Substudium: Fysiologiske mekanismer og adaptationer

Protocol article:
Mette Kaasgaard, Morten Borg, Morten Hostrup, Julie Kissow Kristensen, Gitte Alstrup, Anne Orholm, Pernille Kristiansen, Christian Borbjerg Laursen, Lotte Holm Land, Erik Jakobsen, Rene Horsleben Petersen, Ole Hilberg, Uffe Bødtger. Trial protocol for Sing-a-Lung 2.0: A multi-centre randomised controlled trial to investigate the effects and mechanisms of online delivered singing training vs. usual care 6-18 months after surgical resection for non-small cell lung cancer (NSCLC). 2026. BMJ Open Respiratory Research . DOI: 10.1136/bmjresp-2026-004382

NSCLC-kirurgi

- Hjerte- Lunge- og Karkirurgisk Afdeling T, OUH
- Afdeling for Hjerte- og Lungekirurgi, Rigshospitalet

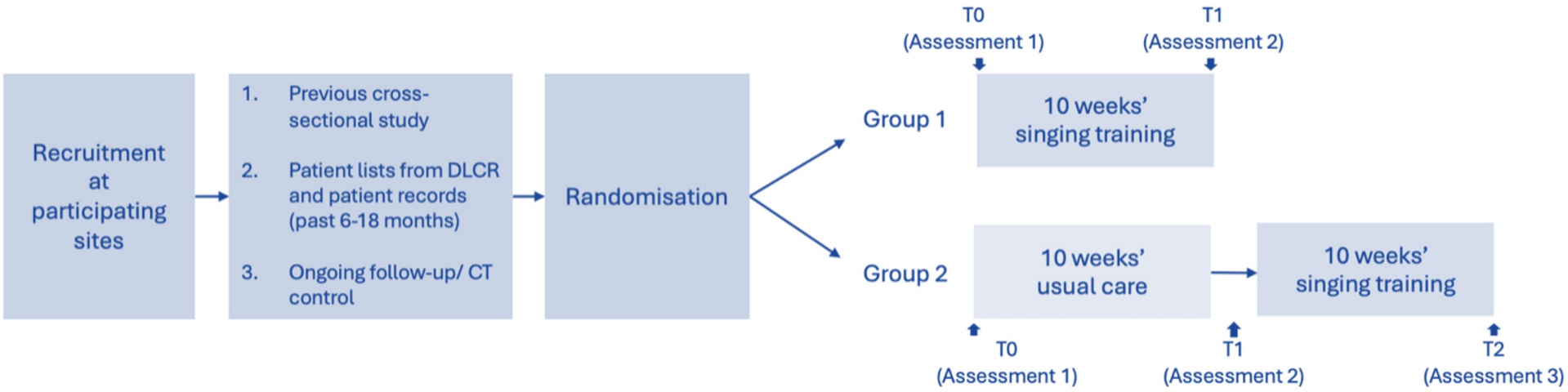
Henvist fra/i kontrolforløb hos

- Sygehus Lillebælt, Vejle (SLB)
- Sjællands Universitetshospital, Roskilde og Næstved (SUH)
- Odense Universitetshospital (OUH)
- Bispebjerg Hospital (BBH)

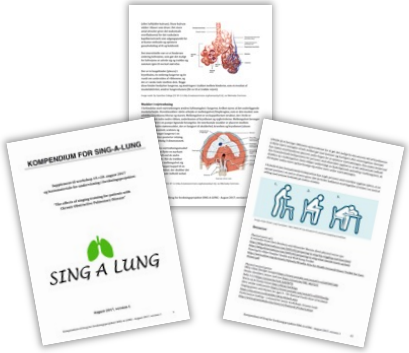
Avancerede fysiologiske målinger

- August Krogh Instituttet, Section for Molecular and Human Physiology, Department of Nutrition, Exercise and Sports, University of Copenhagen

- Patienter med betydende symptombyrde 6-18 mdr efter NSCLC-kirurgi
- Needed sample size: n=78
- Including an expected drop-out-rate of 20%, total needed sample size: n=100


Recruitment at participating sites
1. Previous cross-sectional study
2. Patient lists from DLCR and patient records (past 6-18 months)
3. Ongoing follow-up/ CT control
Randomisation
T0 (Assessment 1)
T1 (Assessment 2)
Group 1
10 weeks' singing training
Group 2
10 weeks' usual care
10 weeks' singing training
T0 (Assessment 1)
T1 (Assessment 2)
T2 (Assessment 3)

Intervention: Singing for Lung Health



Igen anvendes Singing for Lung Health-tilgangen (online).
10 uger med 2 sessioner ugentligt á 1 ½ time = 20 sessioner.

1. Cave Lewis A Fancourt D, P. Singing for Lung Health. in *Routledge Companion to Interdisciplinary Research in Singing* (ed. Heydon R, F. D. & C. A.) Volume iii Wellbeing,
2. Lewis, A. *et al*. Singing for Lung Health-a systematic review of the literature and consensus statement. *NPJ Prim Care Respir Med* **26**, 16080 (2016).
3. Lewis, A., Cave, P. & Hopkinson, N. S. Singing for Lung Health: a qualitative assessment of a British Lung Foundation programme for group leaders. *BMJ Open Respir Res* **4**, e000216 (2017).

Basic outcomes and assessments

Primary outcome	Measures
Physical capacity	• Six Minute Walking Test (6MWT). • Perceived exertion (BORG CR-10 dyspnoea scale), both before and after 6MWT.
Secondary outcomes	**Measures**
Quality of Life	• St. George's Respiratory Questionnaire (SGRQ). • The European Organisation for Research and Treatment of Cancer (EORTC) Questionnaire to Assess Functional QoL and Symptoms in Cancer Patients (EORTC) 30 item Quality of Life Questionnaire (QLQ-C30) (QoL domains). • EORTC Quality of Life Lung Cancer Module Questionnaire (QLQ-LC13) (QoL domains).
Symptom burden	• EORTC QLQ-C30 (symptom domains). • EORTC QLQ-LC13 (symptom domains). • Breathing vigilance (Breathing Vigilance Questionnaire). • Dyspnoea (mMRC (Modified Medical Research Council) Dyspnoea Scale).
Symptoms of anxiety and depression	• Hospital Anxiety and Depression Scale (HADS). • Consumption of psychoactive drugs (yes/no; self-reported).
Airway physiology (lung function)	Spirometry: • Forced Expiratory Volume (FEV1 in litres and % predicted). • Forced Vital Capacity (FVC in litres and % predicted). • FEV1%/FVC% ratio.
Exercise-induced changes in pulse	• Pulse (beats/min) and Heart Rate Response (highest pulse reached minus baseline pulse) (after 6MWT).
Adherence and drop-out	• Continuously registered by the singing teachers and study nurses.
Adverse events	• Any adverse events registered continuously.

Advanced physiological outcomes and measures (sub-group)

OUTCOMES AND MEASURES IN THE SUB-STUDY	
Aerobic fitness/Maximal oxygen uptake	• VO_2-max (incremental ramp test for VO_2 Max Estimate; 70% of maximum heart rate for 20 minutes continuously).
Perceived exertion	• BORG CR-10 dyspnoea scale (both before and after VO_2-max).
Peripheral oxygenation	• Peripheral oxygenation (SpO_2) (absolute and relative)
Respiratory muscle strength	• Maximal in- and expiratory pressures (MIP and MEP).
Exercise-induced changes in pulse	• Pulse (beats/min) and Heart Rate Response (highest pulse reached minus baseline pulse) (after VO_2-max).
Resting blood samples	• Blood Cells (Hemoglobin (Hb) (mmol/L), Hematrocrit (Hct) (L/L or %), Thrombocytes ($x10^9$/L), Leukocyte differential count: ($x10^9$/L)). • Kidney function (eGFR (mL/min/1,73m^2)). • Liver function (ASAT (U/L), ALAT (U/L), ALB (U/L), ALP (g/L)) • Metabolic function (HbA1c (mmol/mol), Lactate dehydrogenase (LDH), mmol/L). • Stress response (Epinephrine (Adrenaline) (nmol/L), Norepinephrine (Noradrenaline) (nmol/L), Dopamin (nmol/L)). • Inflammation and inflammatory drivers (C-reactive protein (CRP) (mg/L), Inflammatory cytokines (TNF-α, IL-1β, IL-6) (pg/mL), JAK2V617F mutation).
Acute physiological response to maximal exercise (VO_2-max)	• Metabolic markers (Lactate (mmol/L)). • Acid-base markers (pH, Partial pressure of carbon dioxide (pCO_2)). (mmHg), Bicarbonate (HCO_3) (mmol/L)). • Oxygenation (Partial pressure of oxygen (pO_2) (mmHg), Oxygen saturation (SaO2/SpO2) (%)). • Electrolyte and Ion Home (Potassium (mmol/L)).

ClinicalTrials.gov trial identifier: NCT07460999

- ClinicalTrials.gov trial identifier: NCT07460999.
- Adheres to SPIRIT statement 2025: updated guideline for protocols of randomised trials.
- TIDieR (Template for Intervention Description and Replication) checklist used for intervention description and reporting.
- Protocol article submitted to BMJ Open Respiratory Research (in peer-review).
- Recruitment start: March 2026
- First singing group start: April 2026
- Expected completion: Oct 2027

Protocol article: Mette Kaasgaard, Morten Borg, Morten Hostrup, Julie Kissow Kristensen, Gitte Alstrup, Anne Orholm, Pernille Kristiansen, Christian Borbjerg Laursen, Lotte Holm Land, Erik Jakobsen, Rene Horsleben Petersen, Ole Hilberg, Uffe Bødtger. Trial protocol for Sing-a-Lung 2.0: A multi-centre randomised controlled trial to investigate the effects and mechanisms of online delivered singing training vs. usual care 6-18 months after surgical resection for non-small cell lung cancer (NSCLC). 2026. BMJ Open Respiratory Research . DOI: 10.1136/bmjresp-2026-004382

Udtalelser fra Hold 1

Det online format:

- *Jeg synes at besværlighederne kan overvindes med humor og hjælpsomhed til hinanden.*
- *Jeg var meget skeptisk som udgangspunkt, men det fungerer fint, når man først er i gang og man er blevet fortrolig med teknikken.*

Udtalelser fra Hold 1

Oplevet udbytte:

- *Selvom jeg egentlig synes jeg har en OK fysisk grundform (trods lungecancer) så giver det mig en øget bevidsthed om mave- og bækkenmuskulaturens samt mellemgulvets/diafragmas betydning for at bedre vejrtækning.*
- *Jeg har fået et dybere åndedræt.*
- *Jeg har helt sikkert øget min samlede muskelkapacitet i hele kroppen.*

At være på holdet:

- *Det er godt at være et lille hold, og for mit vedkommende altafgørende, fordi jeg ikke får gjort øvelser alene, og jeg kommunikerer ikke med træningsmaskiner... Derfor vil jeg overfor kommende deltagere fremhæve støtten i at være flere, der øver sammen.*
- *Selv om vi ikke kender hinanden, er der plads til at udtrykke sig, hvis 'dagsformen' hos den enkelte ikke er så god.*
- *Jeg ville ønske det aldrig stoppede og at jeg kunne fortsætte på holdet.*
- *Kan jeg ikke få 10 uger mere efter dette hold?!*

Funding obtained (til dette projekt)

- Region Zealand
- The Danish Health Foundation
- The Danish Lung Foundation
- Danish Cancer Society, Research Center for Lung Cancer
- Danish Cancer Society
- Novo Nordisk Foundation

Tak for opmærksomheden

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LinkedIn: https://www.linkedin.com/in/mettekaasgaard/