Journal of Yoga and Physiotherapy
ISSN: 2476-1303

Juniper Publishers
key to the Researchers

Review Article
Volume 5 Issue 3 - June 2018
DOI: 10.19080/JYP.2018.05.555664

J Yoga & Physio

A Scoping Review of Combined Yoga and Resistance Exercise for Dyspnea in Lung Cancer Survivors

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Submission: February 12, 2018; **Published:** June 22, 2018

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Abstract

Introduction: Lung cancer is the second most common cancer and is the leading cause of death from cancer. Dyspnea, a self-reported subjective feeling of shortness of breath or breathlessness, is a common symptom experienced by survivors, especially those with advanced stage lung cancer.

Objectives: The purpose of this paper was to (1) perform a scoping review of the literature on yoga and resistance exercise interventions that included a breathing or pulmonary rehabilitation component to address dyspnea in survivors with lung cancer and (2) propose a physiotherapeutic protocol combining yoga with resistance exercise.

Results: A total of 3 single-group studies were found that examined supervised yoga interventions for survivors with lung cancer and 5 RCTs were found examining resistance exercise including a pulmonary rehabilitation component. The three yoga studies involved a total of 28 survivors with non-small cell lung cancer. Findings support feasibility and preliminary efficacy for sleep, mood, anxiety and aspects of quality of life. Five studies, involving 257 survivors with both small cell and non-small cell lung cancer, were found that examined combined resistance exercise intervention and a pulmonary rehabilitation component. Three studies were prehabilitation interventions carried out prior to lung cancer surgery. Benefits were found for measures of lung capacity, six-minute-walk-test distance and quality of life. Based on the findings, a physiotherapeutic protocol is proposed.

Conclusion: Given the scope of practice of physiotherapists and their training in cardiorespiratory therapy, it is hoped that this paper will encourage collaboration with yoga professionals to lead future research in the area.

Keywords: Exercise; Yoga; Physical therapy; Scoping review; Respiratory muscle retraining; Dyspnea

Abbreviations: 6MWT: Six-Minute Walk Test; RCT: Randomized Controlled Trial; SCLC: Small Cell Lung Cancer; NSCLC: Non Small Cell Lung Cancer

Introduction

Fifty percent of newly diagnosed cancers include those of lung and bronchus, breast, colorectal and prostate cancer [1]. Lung cancer is the second most common cancer diagnosed among males and females each accounting for 14% of all new cases and is the leading cause of death from cancer [1]. The diagnosis of lung cancer leads to debilitating symptoms for the survivor, not only from the cancer itself but also from the side effects of the treatment [2].

The largest proportion of cancer cases occur in older adults, and lung cancer is the most common cancer for individuals 70+ years of age for both genders [1]. Unfortunately, older age is associated with increased symptom burden from the disease and its treatment [3]. Authors of a recent qualitative study reported adverse effects including pain, fatigue, weakness and dyspnea [2]. Dyspnea, a self-reported subjective feeling of shortness of breath, or breathlessness, is a common symptom experienced by survivors, especially those with advanced stage lung cancer [2,4,5]. Although highly prevalent and distressing, the impact of dyspnea is often under-recognized despite its negative effects on physical and psychological functioning [5].

Exercise has shown benefit in addressing pain, fatigue, physical fitness and quality of life across cancer types [6,7]. Exercise may prove beneficial for those with lung cancer by increasing muscle strength, attenuating losses in muscle mass, reducing fatigue, and by helping survivors cope with physical and emotional adverse effects related to the disease and its treatment [8]. Survivors, however, report numerous barriers to exercise including low motivation; fear to exercise; lack of knowledge about benefits; and external barriers related to the environment, social support, and symptoms [9]. In particular, the fear of worsening dyspnea with movement and physical activity is a primary reason for survivor unwillingness to participate in exercise [8,10]. Thus, there is a need for further exploration of personalized exercise interventions for survivors of lung cancer

that address overall fitness and functioning, while considering symptoms such as dyspnea.

Resistance exercise training may prove valuable to attenuate both sarcopenia and disease related declines in muscle mass commonly seen in survivors with lung cancer [11]. In addition to improving muscle mass, resistance exercise has been shown to increase peak oxygen uptake in deconditioned individuals and muscle strength in older adults [12]. Importantly, resistance exercise training has been shown to improve an individual's ability to carry out daily activities, and to reduce symptoms of fatigue in both healthy and chronic disease populations [13,14]. Yoga is now widely practiced throughout the world as a mind-body therapy and is considered part of complementary and alternative medicine. Given its gentle nature and focus on breathing and meditation, yoga may address barriers related to dyspnea, and thus prove a viable exercise option for survivors of lung cancer [10].

The purpose of this paper was to review the potential of a physiotherapeutic approach to address dyspnea in survivors with lung cancer that involves combining yoga with resistance exercise training. First, we provide a summary of the evidence on the benefits of exercise interventions in survivors with lung cancer by highlighting findings of key systematic reviews in the area. Next, we present the findings of our scoping review on yoga and resistance exercise interventions for dyspnea in lung cancer. Noting the limited direct research in the area of combined yoga and resistance exercise interventions, we propose a protocol for a physiotherapeutic approach involving yoga and resistance exercise for survivors of lung cancer with a focus on dyspnea.

Exercise in Lung Cancer

A Cochrane Systematic Review examined exercise interventions following lung cancer resection [15]. Three randomized controlled trials (RCTs), with 178 patients, were included in the review. Studies examined combinations of aerobic and resistance exercise training, with only one study including a focus on breathing/dyspnea management. Findings showed a statistically and clinically significant benefit for six-minute walk test (6MWT) distance (50.4m; 95% confidence interval (CI): 15.4, 85.2). No significant benefits were found for quality of life or measures of lung function.

Another recent systematic review examined the benefits of home-based prehabilitation and rehabilitation programs for survivors with non-small cell lung cancer [16]. The review included 11 intervention studies comprising home-based or combined home and clinic/hospital-based supervised exercise. While benefits were shown for physical fitness outcomes, most of the studies involved survivors with early stage lung cancer and only two studies included a focus on breathing/dyspnea management. Importantly, low adherence rates to exercise were common, with studies involving regular supervision and personalized exercise resulting in better adherence and retention of participants [16].

Exercise training has also shown promise for managing dyspnea, both as a prehabilitation intervention and also when delivered as an intervention in the early post-surgical time period for lung cancer [12]. In a systematic review, including 15 studies, interventions primarily involved aerobic (walking and cycling) and breathing exercises. Eight studies involved prehabilitation exercise training (n=8 studies) and findings showed shorter lengths of hospital stays, decreased postoperative complications, and increased 6MWT distance. Seven studies involved postoperative exercise interventions and were found to improve both the 6MWT distance and dyspnea score in survivors [12].

Scoping review on Yoga and Resistance Exercise for Dyspnea

Methods

A scoping literature search of various databases including Medline, CINAHL, Embase and PEDRO was performed to find articles related to lung cancer and combined yoga and resistance exercise with a focus on breathing/dyspnea. As no studies were found examining the combination of interventions, we turned our attention to articles involving (1) yoga with an emphasis on breathing/ dyspnea and (2) resistance exercise intervention that included a breathing or pulmonary rehabilitation component.

Participants: Participants were required to be adults (17 years and older), diagnosed with lung cancer, where the intervention was in an outpatient hospital or in a community-based setting. Participants could be actively receiving cancer treatment or be in the post-treatment phase at the time of the intervention.

Intervention: The primary intervention was supervised yoga with a breathing or meditation component OR supervised resistance exercise intervention with a breathing or pulmonary rehabilitation component. Programs that comprised home-based interventions alone were excluded.

Outcomes: Studies were required to include one of the following outcomes: dyspnea or a measure of lung function, fatigue, muscle strength and quality of life.

Study design: As we anticipated fewer trials in the yoga area, we considered clinical trials including single group pre-post designs, controlled trials and randomized controlled trials. Only randomized controlled trials were included for the resistance exercise studies. Studies were required to be published in English.

Scoping review procedures: Four review members screened the articles for inclusion in the review (SR, MAO, KB, MM). Studies meeting the eligibility criteria underwent independent data abstraction and review by three members of

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the review team (SR, MAO, KB). Information regarding study population, tumour group, methods, interventions, outcomes and adverse events were collected using a structured data abstraction form. Discrepancies were settled by consensus and if necessary, involved a fourth member of the review team (MM).

Results

A total of 3 studies [10,17,18] were found that examined supervised yoga interventions for survivors with lung cancer and a total of 5 RCTs [19-23] were found examining resistance exercise including a pulmonary rehabilitation component. The three yoga studies used a single-group design and involved a total of 28 survivors with non-small cell lung cancer. Interventions involved Hatha (n=2) or Tsa Lung yoga (n=1), and all involved a breathing component. One study included both survivors and their caregivers. Findings support feasibility and preliminary efficacy for sleep, mood, anxiety and aspects of quality of life. No studies reported outcomes related to dyspnea or a measure of lung function. Further details on the included studies are provided in Table 1.

Table 1: Yoga studies with breathing component.

Author/Year/ Country	Study Design/ Sample size (N)	Patient Details	Intervention Details	Outcome Measures	Study Results	Key Features
Fouladbakhsh/2014 [10] United States	One group, repeated measured design Sample size: N=9	NSCLC Stages I-IIIa Post initial cancer treatment	Hatha Yoga: Viniyoga method 1x40mins/week for 14 weeks 3-week pre-intervention, 8-week yoga intervention, 3-week post intervention Follow up: 3 & 6 months	Sleep quality QoL Stress (salivary cortisol)	Significant improvement in sleep efficiency overtime (p<0.02), mood (p<0.02) and quality of life (QOL) mental & physical subscales (p<0.014), increase in physical health scores (p<0.0001)	Modification of poses for individual needs, Patient education, Focus on meditation, postures, and breathing exercises to deepen and slow the breath
Milbury/2015 [17] United States	Pilot couple based yoga program Sample size: Patient (n=10); Caregiver (n=10)	NSCLC Stages I–IV Receiving at least 5 weeks of radiation therapy	Couple-based Tsa Lung yoga 2-3x45-60min/week over course of 5-6 week	QoL Psychological distress Sleep disturbances Fatigue Health related QoL Spiritual well-being	Feasibility: 80% attended at least 50% of sessions Significant: Increase in spiritual well-being (p=0.03) Medium effect: Sleep disturbance (d=0.60), decreased depressive symptoms (d=0.52)	Dyadic intervention and analysis Program well accepted with high rates of class & at home practice Caregiver results: significant decrease in fatigue, and anxiety
Milbury/2015 [18] United States	Study Design: Single- arm feasibility study Sample size: (N=9)	NSCLC Stages I-IIIB Receiving at least 5 weeks of radiotherapy	Hatha Yoga (Vivekananda Method: couple-based) 2-3 sessions for total of 60mins/ week 15 sessions over course of 5-6 weeks of radiotherapy	QoL, Psychological, distress, Well-being, Fatigue	Significant: Decrease in anxiety (p=0.04), increase in mental health aspects of QoL (P=0.04) Medium/Small effect: Sleep disturbance (d=0.65) and spiritual well-being (d=0.64), and somatization	Couples-based program (dyadic approach) Feasible, acceptable, and safe for the lung cancer population Caregiver results:

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					(d=0.65) *No p-values given	Significant: Sleep disturbances Medium effect: improved physical aspects of QoL

NSCLC: Non-Small Cell Lung Cancer; QoL: Quality of Life; EORTC QLQ: European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire; d=effect size

Five studies [19-23], involving 257 survivors with both small cell and non-small cell lung cancer, were found that examined resistance exercise along with a pulmonary rehabilitation component (Table 2). One study was carried out in the post-treatment phase and involved a 10-week group-based supervised exercise program, once a week. No significant differences were found between the intervention and control group for any outcomes. Three studies were prehabilitation interventions carried out prior to lung cancer surgery. Benefits were found for measures of lung capacity, 6MWT distance and quality of life. The final study examined exercise during palliative chemotherapy and showed benefit for daily activities, functional capacity and symptoms of dyspnea.

Table 2: Resistance exercise studies with breathing or respiratory muscle retraining.

Author/ Year/ Country	Study Design & Sample size	Patient Characteristics	Intervention Details	Outcome Measures	Study Results	Key Features
Huang 2017 [19] China	Three-arm RCT Sample size: N=90	NSCLC, Pre-lobectomy Age (mean±SD): 63.6±6.8 Stage I-III, COPD with a heavy smoking history	1) Combined Pre-operative Pulmonary Rehabilitation (PR) group: one week with high-intensity preoperative PR (inspiratory muscle training (IMT)+resistance exercise 2) IMT-alone group: conventional single-mode IMT 3) control group: routine preoperative care	6-MWD, Peak, expiratory flow (PEF), Fatigue, Dyspnea index, QoL (EORTC-QLQ-C30 and EORTC–LC13)	PR vs Control: 6-MWD (P=0.002) and PEF (P=0.001), QOL scores: significant difference (P=0.035) Global QoL in favour of PR, PR vs IMT group: PEF (P=0.004) in favour of PR	Short term, high intensity pulmonary prehabilitation program including IMT and resistance exercise.
Henke/2014 [20] Germany	RCT Sample size: N=46 (29 patients completed the trial)	NSCLC and SCLC, stages, IIIA/ IIIB/IV, receiving inpatient palliative platinum-based chemotherapy	Intervention group (IG): Endurance training (walking exercise) and breathing techniques, (5 days/ week)+resistance training (every other day) Control group (CG):Conventional physiotherapy	Barthel Index 6MWD and staircase walking Dyspnea: Modified Borg Scale (MBS), QoL: (EORTC QLQ-C30/LC13)	Barthel Index (p=0.041) in favour of IG Functional capacity: 6MWD, staircase walking exercise, and strength capacity in favour of IG (p<0.05) Dyspnea: Significant decrease in the level of dyspnea in the IG, (p<0.05) QoL: Significant differences in specific component scores only	Benefit of enhanced physiotherapy including endurance training and strength training *

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Brocki/ 2014 [21] Ireland	RCT Sample size: N=78	Age (mean±SD): 64.5±9.5, Radical Surgery for lung cancer	10-week group-based supervised exercise programme, once a week: 15min warming up, followed by 20min aerobic exercise, 15min muscle strength training and 10min cooling down/relaxation, Intervention included dyspnea management techniques.	Health-related QoL: 36-Item Short Form Health Survey version 2 (SF36), Functional exercise capacity: 6MWT, Lung function: spirometry	No difference between groups at any time-point. Both groups increased their walking distance (IG: 61 m, 95% CI: [43;79] and CG: 55 m, 95% CI: [40;70]) and this increase was sustained after one year	The exercise programme was personalized according to physical capability and submaximal exercise test. Home exercises given to both groups
Morano/2014 [22] Brazil	Study design: Randomized single-blinded exploratory studies Sample size: N=19; Control n=9; PR n=10	Patients undergoing lung cancer resection and with moderate-severe COPD	10 face to face session in one week (twice a day) Preoperative pulmonary rehabilitation: 1. Endurance training 20 min target: treadmill or Nu-step or arm ergometer or arm-R-size exercise, 2. Strengthening(UE/LE alternating every other day) using theraband: 2 sets of 10-12; 3. Inspiratory muscle training IMT: 15-20 min of daily use Slow breathing: 10 min each session, prolonged expiratory time using pursed lips Weekend exercise: Individuals goals set collaboratively	Postoperative pulmonary complications and mechanical ventilation (they measured only baseline values of pulmonary function and dyspnea scores)	Short term preoperative pulmonary rehabilitation is feasible. No statistically significant findings.	Finding of shorter time of chest tube may indicate a better lung re-expansion, a results that may be associated with routine use of IMT
Morano/2013 [23] Brazil	Randomized clinical trial Sample Size: n=24 Pulmonary rehabilitation (PR) group: n=12(recruited) n=12 completed Chest physiotherapy	Patients undergoing lung cancer resection for NSCLC Age: CPT: 68.8±7.3 PR: 64.8±8	4 weeks of preoperative pulmonary rehabilitation (PR) VS CPT PR: 1. UE PNF pattern with light weight 2. LE endurance on	Spirometry: Fev1, FVC, MIP(maximal inspiratory pressure), MEP(maximal expiratory pressure) Quality of life: SF-36	Significant increase: FVC in Litres and % (p=.02, p=.00 respectively) MIP (P=.00) MEP (P=.00) SF-36 physical component summary (p=0.07)	Improvement in preoperative functional capacity, fewer postoperative pulmonary complications, postoperative stay.

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	(CPT): n=12 recruited, n=9 postoperative outcome completed	Stage: I/II: CPT: 9, PR: 11 IIIA: CPT:3, PR:1	treadM, 10 mins week 1, ↑ 10 mins each week, 30 mins week4, 80% of max 3. IMT 10-30 mins daily, 20% of max inspiratory pressure, ↑ 5-10% each session, reach 60% by end of the month. CPT: lung expansion techniques, sustained maximal inspiration, fractional inspiration, pursed lips, flow based spirometry. All participants: Counselling for pre and postop care, energy conservation, relaxation, nutrition.			

SCLC: Non-Small Cell Lung Cancer; QoL: Quality of Life; EORTC QLQ: European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire; SF-36: medical Outcomes Short Form 36 Quality of Life Questionnaire.

Discussion

Proposed physiotherapeutic yoga protocol

Current exercise guidelines for cancer largely reflect physical activity recommendations for the general population [24]. At present, the most beneficial exercise regimen for survivors of lung cancer in terms of type, frequency, and duration is currently not known [12,15,16,25,26]. Based on current evidence, it is likely that an exercise program including a therapeutic yoga focus on the mechanics of breathing as well as a resistance exercise program that includes inspiratory muscle training would be both acceptable to, and beneficial for survivors (Figure 1). Table 3 includes a rationale for a combined physiotherapeutic yoga and resistance exercise protocol that aims to address the needs of survivors of lung cancer. Key components of the combined intervention include yoga practice with attention to the mechanics of breathing, resistance exercise including inspiratory muscle retraining, and a cool-down with a focus on stretching of key muscles of respiration.

Table 3: Proposed protocol for physiotherapeutic and yoga exercise program.

Program Components	Program Details
Warm-up	Options: Breathing exercises, shoulder range of motion exercises with breath regulation OR Low-intensity aerobic exercise
Yoga	Hold a physiotherapeutic yoga session in quiet area with minimal distraction; Facilitate breathing through supported positions that relax abdominals and enhance diaphragmatic excursion Ensure focus is on proper breathing pattern Progress exercises from gravity assisted to gravity-eliminated positions: e.g., sitting or standing to supine Use manual contacts and manual techniques to cue proper breathing and chest wall movement Progress exercises to functional positions and activities; Enhance self-management by teaching home exercises and escape positions for managing dyspnea Frequency: 1-2 days per week consider group-based session
Resistance Exercise Training	6 to 8 major muscle groups Start at 40% of 1 Repetition Maximum, 2 sets of 8-10 repetitions progress repetitions to 2 sets 12-15 then increase resistance intensity 5%. Intensity: no greater than 2-3 on the Modified Borg Scale for dyspnea

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	Frequency: minimum 2 days per week Consider Inspiratory Muscle Retraining with respiratory training device: 10 minutes progressing to 30 minutes daily
Cool-down: focus on stretching of inspiratory & expiratory muscles	Scalenes, pectoralis major & minor, latissimus dorsi, serratus anterior, rectus abdominus and internal & external obliques
Reduce workload/ discontinue exercise	Excessive fatigue post-exercise Muscle soreness >48 hours Exacerbation of dyspnea (>3), excessive coughing or increase in pain during or following sessions

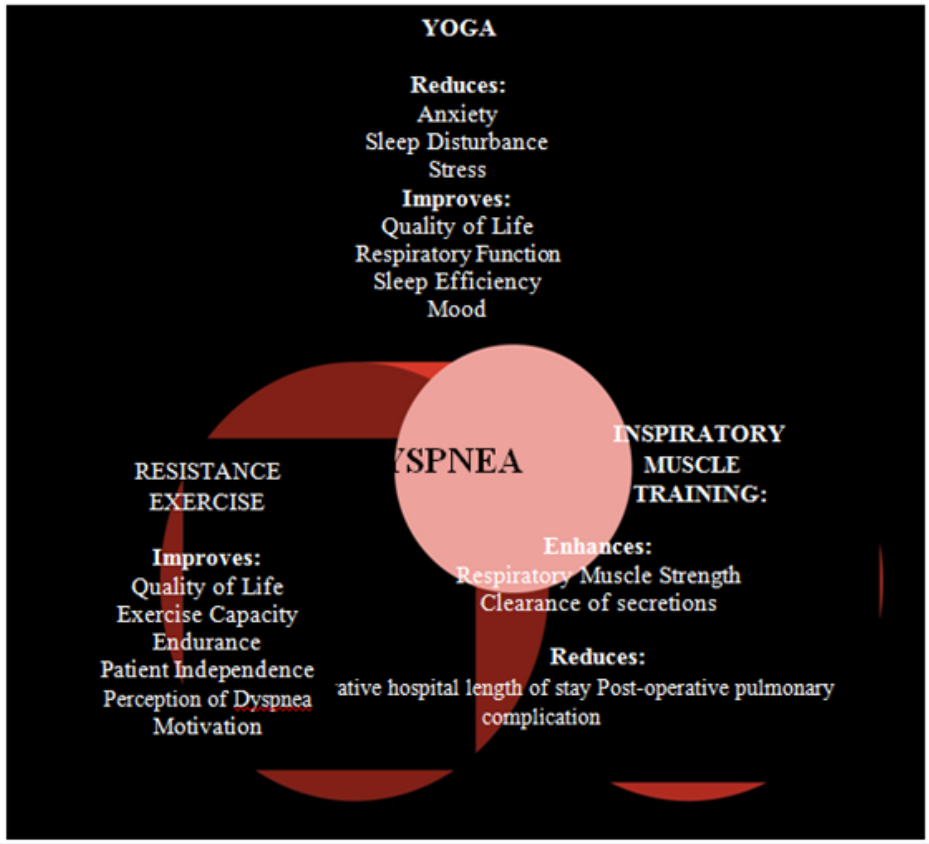

Figure 1: Potential role of exercise in addressing Dyspnea.

Resistance exercise: Resistance exercise training optimizes physical efficiency and performance [27,28]. With repeated bouts of appropriately prescribed resistance exercise the musculoskeletal system undergoes a progressive positive adaptation to the imposed stress, and the survivor's ability to resist physical fatigue is enhanced [27]. Moreover, using the similar principles, respiratory muscle training may be used to optimize lung function by targeting the strength of inspiratory muscles. Deeper, more efficient breathing allows more oxygen to enter the bloodstream with each breath while strengthening the breathing muscles. Interventions may include teaching diaphragmatic breathing, segmental and purse-lipped breathing; and inspiratory muscle training (IMT) using a breathing device [29,30]. In other disease conditions, IMT has been shown to improve inspiratory muscle function, decrease symptoms of dyspnea and allow patients to exercise more comfortably [31]. As seen in the results of this scoping review, early evidence supports its use in survivors of lung cancer.

Yoga component: Yoga is a way of life as based on the eastern traditions of India, Tibet and China. Yoga consists of three principal components as pranayama (breathing exercises), Meditation (dhyana), and asanas (postures) [32]. There are many different styles and types of yoga commonly practiced in the western world. Hatha yoga is a traditional form of yoga from India. Hatha yoga involves a series physical postures and breathing techniques, and is a method used to calm the body, mind and spirit in preparation for meditation. Hatha yoga includes the styles of Ashtanga, Iyengar, Anusara, Vivekanada, and Vinyasa. Tsa Lung, a Tibetan form of yoga, uses breath retention techniques with physical movements and visualizations to promote relaxation and healing, and to still

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the mind. Early evidence from this scoping review suggests potential benefit from yoga for symptoms of dyspnea. Given other reported benefits of yoga for sleep, cancer-related fatigue, psychosocial distress, and musculoskeletal symptoms [32]; further investigation of yoga as an intervention for survivors with lung cancer is warranted.

Exercise safety considerations: Prior to performing exercise testing or training, information must be collected on important diagnostic and treatment variables such as the survivor's type and stage of lung cancer, cancer treatments training. received or ongoing, and identify any acute or chronic adverse effects related to the cancer and/or cancer treatment [24]. Table 4 provides a list of precautions/potential contraindications to exercise that includes considerations specific to lung cancer. Given the older age of survivors with lung cancer further screening for co-morbid conditions is needed. Following a simple screening tool such as the Revised PAR-Q (Canadian Society for Exercise Physiology's web site http://www.csep.ca) may be useful to identify survivors of lung cancer who require further medical evaluation prior to taking part in exercise testing or

Table 4: Precautions/potential contraindications to exercise specific to lung cancer.

Body System	Precautions/Potential	Comments
Musculoskeletal	Bone, back or joint pain of recent origin Unusual muscular weakness Severe Cachexia Unusual/extreme fatigue	High risk of bone metastases if presenting with bone pain or onset of unusual muscle weakness Cachexia and exhaustion may be seen in advanced lung cancer and may limit exercise tolerance
Cardiovascular	Chest pain Resting pulse >100/min or <50/min Resting blood pressure >160 mm Hg systolic or <85mmHg and >110 mmHg Diastolic or <50mmHg Irregular pulse Swelling of ankles	Presenting factors indicate higher risk of cardiac event with exercise
Pulmonary	Severe dyspnea: respiration rate >14 breaths/ minute at rest Coughing, wheezing Chest pain increased by deep breath Oxygen saturation <90% Dyspnea >4 on Borg 10-point	Inadequate ventilator capacity for exercise

Pre-exercise screening should include assessment of the survivor's vital signs (blood pressure, heart rate, oxygen saturation, respiration rate and dyspnea evaluation), as an indication of overall health status [28]. Prior to assessment, survivors should rest for a period of at least 10 minutes. A heart rate monitor can be provided to the survivor with lung cancer to wear while exercising so that heart rate response can be easily observed. Vital signs should be taken before, during and after exercise testing and training to ascertain safety of exercise. Survivors with abnormal readings should refrain from exercise until such time as normal readings are obtained, or if remaining abnormal should be referred to their oncologist or primary care physician for further medical evaluation [28]. A dyspnea visual analog scale, such as the modified Borg Scale, can be used to measure the perceived level of breathlessness before and after the intervention [33]. Oxygen saturation levels can be monitored during exercise and may inform the need for rest/recovery.

Special considerations for dyspnea during Exercise: Simple interventions to relieve breathing distress during exercise, such as performing exercise in a supported sitting position, may be introduced to allow for increased lung expansion. In survivors with lung congestion, chest physical therapy techniques may be incorporated to open airways prior to exercise [34]. Recovery or escape positions to ease breathing should be demonstrated to the survivor with lung cancer and their caregivers as a means to manage episodes of dyspnea during exercise or daily activities [34]. Importantly, survivors should be taught to use escape positions to increase ventilatory capacity when experiencing dyspnea during exercise testing and training sessions. As an example, one escape position involves leaning forward in a seated position and supporting the thorax by bracing the forearms against a chair or on the knees. Alternatively, the survivor can lean against a wall in a similarly supported standing position [34]. Pacing is another important aspect for those with dyspnea and is critical to ensure exercise performance falls within the limits of a survivor's ventilatory capacity. If a survivor becomes slightly short of breath, they are instructed to stop the exercise, attain an escape position, and use controlled purse-lip breathing (to increase end-expiratory pressure and improve oxygenation) until the symptoms subside [34].

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Conclusion

As can be seen from the foregoing review of the literature on yoga and resistance exercise for survivors of lung cancer, the body of literature has been minimal and research supporting the efficacy of interventions is generally lacking. There is a need for further research examining the benefits of a lung cancer-specific program involving combined yoga and resistance exercise training for symptoms of dyspnea. Given the scope of practice of physiotherapists and their training in cardiorespiratory therapy, it is hoped that this paper will encourage collaboration with yoga practitioners to lead future research examining rehabilitation strategies for dyspnea in survivors of lung cancer.

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How to cite this article: Rewar S, Al Onazi M, Boudrea K, McNeely ML. A Scoping Review of Combined Yoga and Resistance Exercise for Dyspnea in Lung Cancer Survivors. J Yoga & Physio. 2018; 5(3): 555664. DOI: 10.19080/JYP.2018.05.555664.

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DOI: 10.19080/JYP.2018.05.555664

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