



Pre-op breathing exercise training prevents complications

The benefits of a single physiotherapy education and breathing exercise training session

Author : Liesbeth Raymakers

Upper abdominal surgery is the most frequent major surgical procedure performed in developed countries. A postoperative pulmonary complication (PPC) is the most common serious complication after this type of surgery; the reported incidence is between 10% and 50% of patients.

A PPC is strongly associated with increased mortality, morbidity, and healthcare costs. Pulmonary complications (including pneumonia and severe atelectasis) are caused by postoperative pathophysiological reductions in lung volumes, respiratory muscle function, mucociliary clearance, and pain inhibition of respiratory muscles.

Education and breathing exercise training are associated with a 75% relative risk reduction, but advances in minimally invasive surgery, differing levels of experience of therapists and timing of education have never been evaluated.

Patients listed for upper abdominal surgery are required to attend a hospital multidisciplinary outpatient clinic for presurgical evaluation within 6 weeks of surgery. At these clinics, patients are seen by a nurse, anaesthetist, doctor, and, if required, a stomal therapist. An additional physiotherapy session was provided to consenting patients.

In this methodologically strong RCT, preoperative physiotherapists in 3 hospitals randomly assigned 441 consecutive participants to either intervention (information booklet plus preoperative physiotherapy education and training) or control (information booklet alone). A standardised physical and subjective assessment were performed.

The intervention consisted of an additional single 30 minute education and breathing exercise coaching session with the physiotherapist.

Participants were educated about the possibility of PPCs after surgery and given an individualised risk assessment. The effect of anaesthesia and abdominal surgery on mucociliary clearance and lung volumes was explained. Consequences of bacterial stagnation in the lungs were highlighted, utilising the booklet's diagram of mucociliary clearance. Early ambulation was highlighted, as were self directed breathing exercises, vital to protect their lungs during the inactivity phase and to commence them immediately on regaining consciousness and to continue them hourly until fully ambulant. The session was finalised by practicing the prescribed breathing exercises together.

Once operated, other than the daily early ambulation programme and the brief breathing exercise reminder on the first postoperative day, no additional respiratory physiotherapy was provided to either control or intervention participants. Only when a PPC developed, respiratory physiotherapy was delivered.

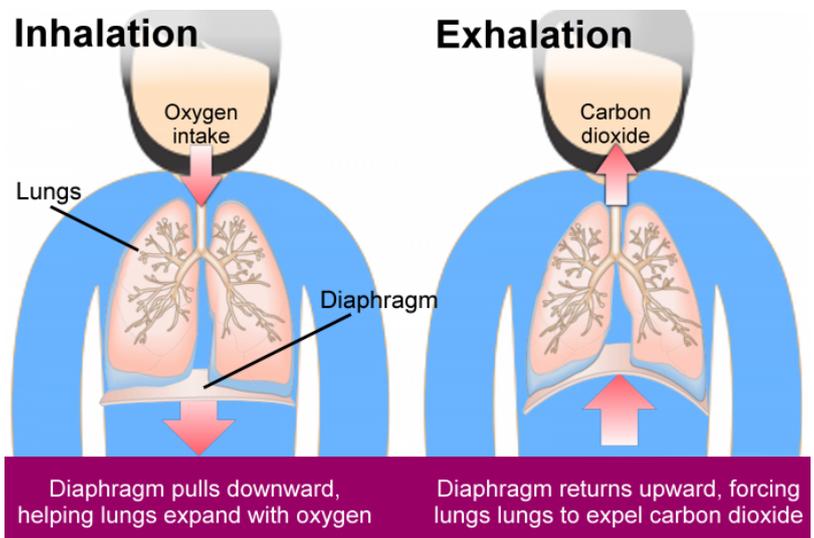
Primary outcome was the incidence of a PPC within 2 weeks of surgery, scored with a standardised tool. Further outcomes were length of hospital stay, number of days in the ICU, QoL at 6 weeks, hospital readmissions, and 12 month mortality.

20% of participants developed a PPC, 12% in the intervention group, and 27% in the control group. The incidence of PPCs halved, but no other differences were detected.

There was a gradient in PPC reduction according to surgical category, with the greatest response to preoperative physiotherapy in colorectal surgery, then upper gastrointestinal surgery, with the least difference between groups for urology. PPC reduction attributable to the preoperative intervention was greatest in participants educated by an experienced physiotherapist, in men, and in those younger than 65 years.

These results are important considering existing evidence for other methods to prevent PPCs. These include preoperative inspiratory muscle training, "prehabilitation", incentive spirometry, and postoperative chest physiotherapy.

Considering how effective preoperative education is in independently reducing PPCs, the benefit attributed to inspiratory muscle training may come from just educating the patients preoperatively on breathing exercises rather than the effect of the training device itself.



> From: Boden et al., *BMJ* 360 (2018) j5916 (Epub ahead of print). All rights reserved to BMJ Publishing Group Ltd..
[Click here for the online summary.](#)



Sign up on our website and get access to the latest evidence based articles reviewed and explained by our experts.

Visit www.anatomy-physiotherapy.com

Anatomy & Physiology works with international renown experts and writers to provide a current and evidence-based content service to students, physiotherapist, musculoskeletal health professionals and educational institutes around the world in 5 key thematic areas and 7 different languages.

The best summaries to help you to improve your care. Easy and accessible.



Musculoskeletal



Aging & Chronic
Diseases



Women's Health



Lifestyle &
Prevention



Psychosomatic