



## Letter to the editor

## Respiratory physiotherapy as a key player in the effort to make surgery greener during and beyond the COVID-19 pandemic



Dear Editor,—We have perused with interest the study by Patel and Smith-Steinert regarding environmental sustainability in surgery [1]. The authors have thoroughly investigated the environmental impact of intraoperative anesthesia. They have also assessed the impact of an environmental education intervention on the personnel of the operating room. While their findings seem to have a major potential to make surgical practice more sustainable, we believe that the contribution of respiratory physiotherapy (RP) to decreasing the surgery-related carbon footprint could have been also addressed as well.

RP employs manual (percussion, vibration, deep breathing) or mechanical means (chest oscillation devices) aiming to improve airway clearance. RP has been gradually integrated into surgery since the early 20th century. Nowadays, preoperative or postoperative RP is used in cardiovascular, abdominal and orthopedic surgery, in order to decrease the risk for postoperative pulmonary complications (PPC), improve patients' functionality and accelerate their hospital discharge and return to everyday life activities [2].

RP seems to play an important role too in decreasing the carbon footprint of a surgical procedure. RP decreases the length of hospital stay, either by increasing patients' residual function or by reducing the risk for complications associated with prolonged hospitalization. As a matter of fact, RP has been associated with 20–50% less postoperative infections among patients undergoing orthopedic or abdominal surgery [3,4]. Over the years, RP experience has enhanced the concept of early mobilization, which emphasizes not only perioperative RP, but also the need to initiate RP the earliest possible, even on postoperative day 0. A recent prospective randomized clinical study from our research group compared the effect of RP initiated in postoperative days 0 and 1 in patients undergoing elective thoracic surgery [5]. The results indicate that patients who received enhanced RP on postoperative day 0 had an up to 1.8 days shorter hospital stay when compared to patients who received conventional RP from postoperative day 1 onwards. Given that each extra day of hospital stay may produce an average of 125 kg of CO<sub>2</sub> equivalents per patient [6], early-onset and enhanced RP in our cohort could have reduced the surgical carbon footprint by approximately 4.9 tonnes of CO<sub>2</sub> equivalents.

The potential of RP to reduce the carbon footprint of surgery has gained greater relevance during the COVID-19 pandemic. The extensive use of personal protective equipment (PPE) in conjunction with pre- and post-operative testing for SARS-CoV-2 add a considerable amount of waste to any type of surgery [7]. Therefore, exploring the potential of different types of RP (manual and mechanical) to counter the excess waste is a worthy endeavor. Particularly, early onset RP should be further assessed based on the availability of relevant

indications. Shorter hospital stay seems to be extremely relevant in this period since the patients have lower chances to get infected with SARS-CoV-2 during their hospitalization.

Moreover, environmental physiotherapy is a relatively new concept [8], whose implementation can be enhanced by enabling RP to play a more active role in reducing the carbon footprint of surgery during and beyond the COVID-19 pandemic. Hence, sustainability training as described by Patel and Smith-Steinert is also essential in this context [1]. Integrating environmental awareness to the training of healthcare professionals involved in RP might improve climate responsibility at personal level and help expand the social stance of the field.

Certainly, it should not be neglected that respiratory physiotherapy has an ecological footprint per se. This derives from the use of electronic and non – electronic equipment during physiotherapy sessions, their maintenance, the related paperwork (documentation, referrals, and insurance compensation forms) and the transportation of physiotherapists and medical supplies. Although one can argue that, the excess environmental burden is limited, because physiotherapists already work in and commute to hospitals, the carbon footprint of increased RP provision should be investigated in future studies [9]. Relevant data can help construct a real – world equilibrium of the contribution of RP to greener surgery.

Overall, RP has a documented contribution to decreasing hospital stay and surgical complications. Its contribution to making surgery and healthcare services in general more environmentally sustainable is yet to be assessed. Such a research culture can only be initiated if original research for sustainable healthcare pays more attention to RP. In the COVID-19 era, the findings of such research can be translated into improved strategies for climate change mitigation in healthcare.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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