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Pulmonary tele-rehabilitation in the COVID-19 era.

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For patients with chronic obstructive pulmonary disease, pulmonary rehabilitation (PR) has demonstrated improvements in physiological measures(1), patient-reported outcomes(2), and health economic indices(3). There is also a growing body of evidence around improvements in frailty(4) sedentary behaviour(5) and social-connectedness(6). The clinical need for alternative delivery modes of programmes, such as pulmonary tele-rehabilitation (PTR) has been clearly established in the COVID-19 pandemic, whereby conventional face-to-face programme provision seems an unlikely reality for the foreseeable future. The rapid remodelling of health services as a result of COVID-19 provides an exciting opportunity to reflect about the traditional aims, structure, outcomes and components of conventional PR programmes. Hansen et al(7) in a recent issue of Thorax provide an excellent, concise literature review, in combination with outcomes from their study, which suggest that PTR is certainly no worse than conventional PR for commonly reported patient outcomes and could indeed offer some benefits in terms of programme completion. However, there are limitations which we believe should be highlighted further.

Hansen et al(7) recruited patients who fulfilled the 'real world' inclusion criteria for hospital-based PR. The authors suggest that this may explain why neither study group achieved minimal clinically important difference (MCID) in outcomes. However, patients with similar functional disability and low walking distances included in UK national PR audits(8) did achieve MCIDs and therefore their assumption and external validity of their findings should be questioned. The research hypothesis that PTR would show superiority in 6MWT improvement compared to conventional PR was not demonstrated. The robust blinding procedure used within the study may have reduced any inflated gains that may have otherwise been seen in such trials with limited assessor and this approach should be commended. However, we also believe that the lack of significant difference in walking distance between groups may have also been due to limitations in the method of delivery of the exercise component which was not aligned across both models of programme. Those patients randomised to PTR may not have had a fair chance to show superiority according to the 6MWT primary outcome measure. For example, in comparison to the conventional PR group, the PTR warm-up period was shorter, with no walking component. The PTR group exercised for 35 minutes three times weekly (105 min per week) compared to the conventional PR group who exercised for 60 minutes twice weekly (120 min per week). The primary outcome measure is a walking test, but the intervention does not

specifically focus on walking, whereas walking is clearly repeated for the control group. It would be interesting to know the rationale for the decision to make the delivery methods different between groups. More information is required about physical activity guidance given to the PTR group as no practical exercises were reported next to this specific education session in the appendix, compared to practical exercise given in the PR group programme. The course of the 6mwt test was only 20m rather than 30m, which may have limited the distance covered and improved upon for both groups because of a greater frequency of turning. Indeed, in the NETT emphysema trial(9) from which the MCID for 6MWT was referenced for this article(10), participants walked approximately 40 metres further than those in the current PTR trial, despite having lower FEV1% predicted.

We believe that PTR warrants further research and should be simultaneously trialed in an iterative fashion within clinical services given the current need. It is important for this research to use appropriate outcome measures, and interventions matched to the clinical evidence-based PR programmes which are used. This pragmatic approach is required to enable the PR community to grapple with the challenges of this new mode of delivery while providing patients with a rehabilitation option in the COVID-19 era.

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