



## Systematic review

# Effectiveness of physiotherapy with telerehabilitation in surgical patients: a systematic review and meta-analysis

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## Abstract

**Background** Over the last few years, telerehabilitation services have developed rapidly, and patients value benefits such as reduced travelling barriers, flexible exercise hours, and the possibility to better integrate skills into daily life. However, the effects of physiotherapy with telerehabilitation on postoperative functional outcomes compared with usual care in surgical populations are still inconclusive.

**Objectives** To study the effectiveness of physiotherapy with telerehabilitation on postoperative functional outcomes and quality of life in surgical patients.

**Data sources** Relevant studies were obtained from MEDLINE, EMBASE, CINAHL, the Cochrane Library, PEDro, Google Scholar and the World Health Organization International Clinical Trials Registry Platform.

**Study selection** Randomised controlled trials, controlled clinical trials, quasi-randomised studies and quasi-experimental studies with comparative controls were included with no restrictions in terms of language or date of publication.

**Data extraction and synthesis** Methodological quality was assessed using the Cochrane risk of bias tool. Twenty-three records were included for qualitative synthesis. Seven studies were eligible for quantitative synthesis on quality of life, and the overall pooled standardised mean difference was 1.01 (95% confidence interval 0.18 to 1.84), indicating an increase in favour of telerehabilitation in surgical patients.

**Limitations** The variety in contents of intervention and outcome measures restricted the performance of a meta-analysis on all clinical outcome measures.

**Conclusions** Physiotherapy with telerehabilitation has the potential to increase quality of life, is feasible, and is at least equally effective as usual care in surgical populations. This may be sufficient reason to choose physiotherapy with telerehabilitation for surgical populations, although the overall effectiveness on physical outcomes remains unclear.

PROSPERO registration number: CRD42015017744.

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**Keywords:** Telehealth; Telerehabilitation; Telemedicine; Functional status; Exercise; Surgery; Physiotherapy

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<https://doi.org/10.1016/j.physio.2018.04.004>

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Please cite this article in press as: van Egmond MA, et al. Effectiveness of physiotherapy with telerehabilitation in surgical patients: a systematic review and meta-analysis. *Physiotherapy* (2017), <https://doi.org/10.1016/j.physio.2018.04.004>

## Introduction

Delayed postoperative recovery is one of the main problems after surgery [1]. Postoperative complications contribute highly to postoperative morbidity, and may lead to increased length of hospital stay and mortality, and reduced cost-effectiveness [2–4]. In surgical patients, hand-grip strength, inspiratory muscle strength, physical activities and QoL are risk factors for postoperative complications and poor postoperative functional recovery [5,6].

Physiotherapists play an important role in reducing and preventing the decrease in physiological and functional capacity due to surgery by physical exercise training, and maintenance of physical activity levels over the pre- and postoperative course. These interventions are potentially effective for postoperative functioning [7]. Health systems are currently engaged in a process of innovation to improve efficacy and efficiency in healthcare services [8,9]. Telerehabilitation is one of these developments, defined as the delivery of rehabilitation services to patients at a distance using information and communication technologies [10]. Telerehabilitation may contain assessment, education, monitoring and exercise interventions [9,10]. Over the last few years, telerehabilitation services have developed rapidly, and have the potential to be a more cost-effective alternative for outpatient assessment and treatment in hospital due to the ability to reach people in remote areas or at home. Telerehabilitation interventions have been used with success in areas of preventive care and management of chronic diseases, where patients positively valued benefits such as reduced travelling barriers, flexible exercise hours and the possibility to better integrate skills into daily life. Telerehabilitation interventions decrease travelling costs, are significantly less time consuming and are generally more convenient [11]. People also have the opportunity to train more intensively than is possible at a healthcare institution. The feasibility and acceptability of such technology have demonstrated significant patient and clinician satisfaction and improvements in QoL [9,12,13]. Physiotherapy or exercise interventions can be streamed through telerehabilitation, and are valuable in the pre- and postoperative phase for surgical patients.

There is evidence showing the positive effects of physiotherapy with telerehabilitation on clinical outcomes in cancer patients, cardiac patients, and patients with musculoskeletal disorders and depression [14,15]. Moreover, the effects of telerehabilitation on QoL seem to be promising [16]. However, research that demonstrates the effects of physiotherapy with telerehabilitation on postoperative functional outcomes and QoL compared with conventional care in surgical populations is still inconclusive [16].

Therefore, this systematic review aimed to study the effectiveness of physiotherapy with telerehabilitation on postoperative functional outcomes and QoL in surgical patients. The secondary objective was to determine whether telerehabilitation in surgical patients increased patient satisfaction.

## Methods

### *Data sources and searches*

MEDLINE, EMBASE, CINAHL, the Cochrane Central Register of Controlled Trials (CENTRAL), PEDro ([www.pedro.org.au](http://www.pedro.org.au)), Google Scholar (<http://scholar.google.com>) and the World Health Organization International Clinical Trials Registry Platform ([www.who.int/ictpr](http://www.who.int/ictpr)) were searched for eligible studies following the Cochrane Handbook for Systematic Reviews of Interventions [17]. Grey literature was searched using Open Grey ([www.opengrey.eu](http://www.opengrey.eu)). The following keywords and Medical Subject Headings (MeSH) combined with Boolean operators were used: ‘Physical Therapy Modalities’[Mesh] OR ‘Exercise Therapy’[Mesh] OR physiotherap\*[tiab] OR exercise\*[tiab] AND ‘Telemedicine’[MAJR] OR ‘Telecommunications’[MAJR] OR telehealth[tw] AND ‘Surgical Procedures Operative’[MeSH] AND randomized controlled trial[pt] OR controlled clinical trial[pt]. All databases were searched from their inception to November 2016. Appendix A (see online supplementary material) shows the full electronic search.

The references of included studies were checked for other relevant publications in order not to miss any unpublished or ongoing trials. Also, the proceedings and developments of the American Telemedicine Association were followed with care.

### *Study selection*

Randomised controlled trials, controlled clinical trials, quasi-randomised studies and quasi-experimental studies with comparative controls were included with no restrictions in terms of language or date of publication.

Adults aged >18 years with an indication for thoracic, upper abdominal or orthopaedic surgery were included in this review.

Studies on telerehabilitation were included if the intervention contained aspects of physical exercise or exercise therapy combined with health education or intentions to change health-related behaviour. All modalities of the pre- and postsurgical intervention (type, duration, frequency and intensity of the treatment strategies) were taken into consideration. The control intervention was considered as usual care, face-to-face contact or no care. Telerehabilitation that combined incidental face-to-face contact to clinically assess patients on aspects of functional status were included if the intervention was conducted with telerehabilitation.

Studies were excluded if the intervention did not contain physical exercise or exercise therapy via telerehabilitation.

The functional outcome measures were based on the International Classification of Functioning, Disability and Health (ICF) [18]. In this framework, health and health-related components are classified in domains, expressed as

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