Effectiveness of Telerehabilitation in Physical Therapist Practice: An Umbrella and Mapping Review With Meta–Meta-Analysis

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Abstract

Objective. Telerehabilitation is an option that should be adapted as soon as possible to face the crisis caused by coronavirus disease 2019. An umbrella and mapping review with meta–meta-analysis (MMA) of the available scientific evidence was performed to determine whether telerehabilitation could be an effective alternative to conventional rehabilitation in physical therapist practice.

Methods. A systematic review of reviews and a synthesis of the findings of all systematic evidence published to date with a visual map and a meta–meta-analysis (MMA) were performed. A systematic search was realized in Cochrane Database of Systematic Reviews, MEDLINE (PubMed), and Google Scholar. Two independent reviewers performed a data analysis and assessed the quality of the included reviews, assessing the risk of bias using ROBIS.

Results. Twenty-nine articles that met the inclusion criteria were selected and divided according to the type of patient targeted for rehabilitation (patients with cardiorespiratory, musculoskeletal, and neurological conditions). The MMA regarding physical function between telerehabilitation and usual care rehabilitation did not reveal a statistically significant difference for patients with cardiorespiratory and musculoskeletal conditions. For patients with neurological conditions, the MMA revealed a statistically significant but negligible effect size in 6 reviews in favor of telerehabilitation (standardized mean difference = 0.18; 95% CI = 0.03–0.34).

Conclusion. The results of the present review showed that telerehabilitation offers positive clinical results, even comparable to conventional face-to-face rehabilitation approaches.

Impact. The advantages of lower cost and less interference by the rehabilitation processes in patients’ daily life could justify implementing telerehabilitation in clinical settings in the coronavirus disease 2019 era.

Keywords: Exercise, Physical Therapy, Telerehabilitation
Introduction

In recent years, telemedicine has allowed health care professionals to evaluate, diagnose, and treat patients in remote locations using telecommunications networks. A subarea of telemedicine is telerehabilitation, which consists of remotely managing rehabilitation using new telecommunication-based practices.

Telerehabilitation has been employed for treating neurological, cardiorespiratory, and musculoskeletal dysfunctions and facilitates access to rehabilitation services, regardless of geographic location. Telerehabilitation can enable individuals to continue their rehabilitation in their own social/vocational setting and has a potential role in public health emergencies, like the actual pandemic era, because of the limited ability for patients to seek in-person rehabilitation services.

A recent systematic review shows that coronavirus disease 2019 disease will epidemiologically generate a high incidence of disabling functional alterations that have to be addressed in the postacute phases by means of telerehabilitation. However, with respect to the possible benefits of telerehabilitation in this context, previous reports have already indicated barriers to implementing e-health content, such as lack of knowledge and uncertainty regarding the use of technology, and doubts remain as to whether these barriers limit the effectiveness of telerehabilitation and its clinical application.

Telerehabilitation is an option that should be adapted as soon as possible to rehabilitation systems to face the current crisis caused by coronavirus disease 2019 or other pandemics that may occur in the future. For this reason, to thereby improve clinical care in this situation, it seems necessary to determine the effectiveness of telerehabilitation in patients with neurological, cardiorespiratory, or musculoskeletal pathologies. In this article, an umbrella and mapping review with meta–meta-analysis (MMA) of the available scientific evidence was performed to determine whether telerehabilitation could be an effective alternative to conventional rehabilitation in physical therapist practice.

Methods

Design

A systematic reviews of reviews was conducted, as well as a synthesis of the findings of all systematic evidence published based on Smith et al.

Search Strategy

A systematic search was conducted in the following databases for articles published between 1950 and April 15, 2020: Cochrane Database of Systematic Reviews, MEDLINE (PubMed), and Google Scholar. The search string was adapted for each database.

Two independent reviewers conducted the search using the same methodology, and differences during this phase were resolved by consensus. The reviewers also manually searched journals that had published related articles, as well as the reference lists of the included studies. The reference sections of the original studies were also manually screened. The Mendeley citation management software was employed (Mendeley desktop v1.17.4, Elsevier, New York, NY, USA) and hand-checked the results to remove duplicates.

The comprehensive search was combined the following key terms using Boolean operators: intervention (“telerehabilitation,” “telemedicine,” “telehealth,” “exercise,” “web rehabilitation,” “technology rehabilitation,” “computer rehabilitation,” “phone rehabilitation,” and “function”) and review type (“systematic review,” “meta-analysis,” “review literature,” and “qualitative systematic review”).

Inclusion Criteria

The selection criteria for this review were based on methodological and clinical factors, specifically the population, intervention, comparison, outcomes, and study type criteria.

Population

The participants selected for the published studies were older than 18 years and included patients with musculoskeletal, cardiac, respiratory, or neurological diseases. The patients’ sex was irrelevant.

Intervention and Control

The intervention was the telerehabilitation approach. Telerehabilitation was considered as any technology (wearable devices, internet, virtual reality, telephone) that enabled the monitoring or execution of physical therapy rehabilitation, remotely controlled using telecommunication-based practices. Therapy could be focused on physical or cognitive ability. The intervention could be provided as an independent intervention, added to therapy, or embedded in the therapy (eg, standard care or standard therapy). Comparator groups could be standard care, face-to-face rehabilitation, and conventional therapy.

Outcomes

The measures used to assess the results and effects were any kind of variable related to clinical outcomes, especially physical functioning, as well as health-related quality of life.

Study Design

Systematic reviews were evaluated with or without meta-analysis.

Selection Criteria and Data Extraction

First, the 2 independent reviewers performed a data analysis, assessing the relevance of the reviews regarding the study questions and objectives. This initial analysis was performed based on information from each study’s title, abstract, and key words.

If there was no consensus or if the abstracts did not contain enough information, the full text was reviewed. The second phase of the analysis using the full text was performed to assess whether the studies met all the inclusion criteria. Differences between the reviewers were resolved by discussion and consensus moderated by a third reviewer (Fig. 1). The data described in the results were extracted by means of a structured protocol that ensured that the most relevant information was obtained from each study.

Assessment of Methodological Quality

The 2 independent reviewers assessed the quality of the included reviews, assessing the risk of bias using ROBIS, which evaluates the quality across 4 domains: 1) study eligibility; 2) study identification and selection; 3) data collection and study appraisal; and 4) synthesis and findings. ROBIS provides an overall risk of bias for the review as high, low, or unclear. The 2 independent reviewers examined the
quality of the selected studies using the same methodology; disagreements between the reviewers were resolved by consensus with a third reviewer. The inter-rater reliability was determined using a $k$ coefficient ($>0.7$ indicated a high level of agreement between the assessors, $0.5-0.7$ indicated a moderate level of agreement, and $<0.5$ indicated a low level of agreement).

A further quality assessment was conducted using the Quality Assessment Scale for Systematic Reviews developed by Barton et al.15 This 13-item scale (with criteria rated 0–2) was found to be a valid and reliable tool for assessing the methodological quality of systematic reviews. The developers of the scale provide a cutoff score for high-quality reviews ($>20$ out of a possible $26$).15 This evaluation is no longer conducted in a peer-to-peer and independent manner, and only one evaluator evaluated the methodological quality.

**Data Synthesis and Analysis**

Statistical analysis was performed using meta-analyses with interactive explanations (MIX 1.7; BiostatXL).16

The same inclusion criteria for the review was employed, but 2 criteria were added: 1) The Results section contained detailed information on the comparative statistical data (mean, SD, and/or 95% CI) of the main variables, and 2) data for the analyzed variables were represented in at least 2 studies. The summary statistics in the form of forest plots were presented,17 which consist of a weighted compilation of all standardized mean differences (SMDs) and corresponding 95% CI reported by each study and provide an indication of heterogeneity among the studies.

The statistical significance of the pooled SMDs were examined using Hedges’ $g$ to account for a possible overestimation of the true population effect size in small studies.18 The magnitude of $g$ was interpreted according to a 4-point scale: 1) $<0.20$, negligible effect; 2) $0.20$ to $0.49$, small effect; 3) $0.50$ to $0.79$, moderate effect; and 4) $\geq0.80$, large effect.19 The degree of heterogeneity among the studies were estimated by employing the Cochran $Q$ statistic test ($P<.1$ was considered significant) and the inconsistency index ($I^2$).20 An $I^2$ greater than 25% is considered to represent low heterogeneity, an $I^2$
greater than 50% is considered medium, and an $I^2$ greater than 75% is considered to represent large heterogeneity. The $I^2$ index is complementary to the $Q$ test, although it has a similar problem with power as the $Q$ test with a small number of studies. A study was therefore considered heterogeneous when it fulfilled one or both of the following conditions: 1) the $Q$ test was significant ($P < .1$) and 2) the result of $I^2$ was greater than 75%. To obtain a pooled estimate of the effect in the meta-analysis of the heterogeneous studies, a random-effects model was performed as described by DerSimonian and Laird.

Evidence Map
A visual map of the scientific evidence of each systematic review was created to visually display the information of each review and included 4 dimensions based on the map created by Miake-Lye et al.

1) Number of items (bubble size): The number of items in each included revision is represented proportionally by the size of the bubble.
2) Study population (bubble color): The study population will be determined from each bubble's color.
3) Effect (x-axis): The authors classified each review according to the effects found. When the intervention group showed greater benefits compared to the control group, the intervention was classified as “potentially better”; otherwise, the intervention was classified as “potentially worse.” When there was insufficient evidence, the intervention was classified as “unclear.” If there were no differences, the intervention was included as “no differences.” If there were contradictory results, we included the intervention as “mixed results.”
4) Strength of findings (y-axis): The reviews were sorted into the following 5 categories according to the Grading of Recommendations, Assessment, Development and Evaluations approach: high strength of evidence, moderate strength of evidence, low strength of evidence, very low strength of evidence, or unable to determine the strength of evidence. If each article explicitly provided its level of recommendation, this was added. If it was not explicitly reported, this was inferred by the researchers of this article. If it was not possible to determine (because of a lack of information), the studies were classified as “unsettled.”

Results
Twenty-three articles that met the inclusion criteria were selected and divided according to the type of patient targeted for rehabilitation (cardiac or respiratory, musculoskeletal, or postoperative and neurological telerehabilitation). The characteristics of the studies from which data were extracted (sample size, demographic characteristic, intervention, outcomes, main results, and conclusions) are presented in the Supplementary Table.

Study Population Characteristics
A set of 5 reviews evaluated telerehabilitation for patients with cardiorespiratory diseases, which included mostly cardiac events, cardiovascular disease, and chronic obstructive pulmonary disease.

Seven reviews were included on the use of telerehabilitation for patients with musculoskeletal disorders or who had recently undergone surgery. The main conditions for the patients with musculoskeletal disorders were chronic pain, rheumatoid arthritis, and osteoarthritis. The most common operations were knee arthroplasties, knee and hip replacements, and orthopedic operations. Thirteen reviews were included that evaluated the efficacy of telerehabilitation for patients with neurological diseases, the most frequent of which were multiple sclerosis, stroke, acquired brain damage, Alzheimer disease, and traumatic brain injury.

Interventions
All interventions were based on telerehabilitation, either in isolation or combined with classical rehabilitation. Telerehabilitation was considered any technology (wearable devices, internet, virtual reality, telephone) that allowed for the monitoring or execution of rehabilitation or therapy.

The aim of the interventions was to increase motor function or physical capacity using telerehabilitation-based home exercise protocols. The interventions consisted of repeated motor tasks or exercises, balance exercises, and motor reeducation or aerobic exercises. It was also included education-based interventions that sought to promote changes in lifestyle or health behaviors.

Outcomes
The main variables of interest in the various reviews differed according to the types of patients included. The reviews that focused on cardiac and respiratory telerehabilitation assessed physical function and capacity, adverse events, dyspnea, and health-related quality of life. At the musculoskeletal level, the main variables analyzed were physical function, pain, disability, and health-related quality of life. The reviews that analyzed patients with neurological disorders assessed motor and cognitive function, disability, independence for activities of daily living, and health-related quality of life. Many of the reviews evaluated aspects related to the implementation of telerehabilitation, such as satisfaction with therapy and cost-effectiveness.

Methodological Quality Assessment
Regarding the methodological quality, the agreement between the 2 evaluators was high, according to the $\kappa$ coefficient ($\kappa = 0.88$). The risk of bias of the included reviews is shown in Table 1 and Figure 2, and the methodological quality assessment is presented in Table 2.

Findings
Cardiorespiratory Telerehabilitation
Five systematic reviews with meta-analyses evaluated the efficacy of telerehabilitation for patients with cardiac or respiratory diseases and included 34 primary studies. Regarding physical function, 4 reviews showed similar results between telerehabilitation and usual care interventions and 1 review showed better results for telerehabilitation intervention. However, the strength of the findings was unclear (Fig. 3).

With regard to the quantitative analysis, the MMA of physical function did not reveal a statistically significant difference in 2 reviews (SMD $= 0.03$; 95% CI $= -0.15$ to 0.22; $P = .07$) without evidence of significant heterogeneity ($Q = 1.31$; $P = .25$, $I^2 = 24%$) (Suppl. Fig. 1).
Table 1. Risk of Bias Assessment in Systematic Reviews by ROBIS Scale

| Study                  | Phase 2 | Phase 3 |
|------------------------|---------|---------|
|                        | 1. Study Eligibility Criteria | 2. Identification and Selection of Studies | 3. Data Collection and Study Appraisal | 4. Synthesis and Findings | Risk in Bias of Review |
| Agostini et al28       | L       | L       | L       | L       | L                        |
| Appleby et al35        | L       | L       | L       | L       | L                        |
| Chan et al26           | L       | L       | L       | L       | L                        |
| Chen et al34           | L       | L       | L       | L       | L                        |
| Corti et al35          | L       | L       | L       | L       | L                        |
| Cotelli et al43        | L       | L       | L       | L       | L                        |
| Cottrell et al29       | L       | L       | L       | L       | L                        |
| Grona et al30          | L       | H       | L       | L       | L                        |
| Huang et al24          | L       | L       | L       | L       | L                        |
| Jiang et al31          | L       | L       | H       | L       | L                        |
| Johansson and Wild42   | L       | H       | H       | L       | H                        |
| Laver et al46          | L       | L       | L       | L       | L                        |
| Laver et al41          | L       | L       | L       | L       | L                        |
| Lundell et al27        | L       | L       | L       | L       | L                        |
| Ownsworth et al40      | L       | L       | L       | L       | L                        |
| Pastora-Bernal et al33 | L       | H       | L       | L       | L                        |
| Rintala et al39        | L       | L       | L       | L       | L                        |
| Rintala et al38        | L       | L       | L       | L       | L                        |
| Schröder et al37       | L       | L       | L       | L       | L                        |
| Shukla et al36         | L       | H       | L       | L       | L                        |
| Tchero et al36         | L       | L       | L       | L       | L                        |
| Wang et al34           | L       | L       | H       | L       | L                        |
| Wu et al25             | L       | L       | H       | L       | L                        |

*L = low concern; H = high concern; U = unclear concern.

Musculoskeletal Telerehabilitation

Seven reviews evaluated the role of telerehabilitation in patients with musculoskeletal conditions and included 71 primary studies. Regarding physical function, 7 reviews showed no differences between telerehabilitation and usual care interventions, with very low to moderate-high evidence (see Fig. 3).29–35 One review could not draw conclusions and showed unclear results in patients with rheumatoid arthritis.36 Finally, Agostini et al showed better results in terms of functionality for telerehabilitation compared to usual care in patients with knee arthroplasty.28

With regard to the quantitative analysis, the MMA of physical function did not reveal a statistically significant difference in 3 reviews (SMD = 0.00; 95% CI = −0.44 to 0.44; *P* = .07) with evidence of significant heterogeneity (*Q* = 18.61; *P* < .01; *I*² = 89%) (Suppl. Fig. 2).

Neurological Telerehabilitation

Thirteen systematic reviews, including 172 primary studies, evaluated the efficacy of telerehabilitation for patients with neurological disorders, although there was a high level of heterogeneity between the patients and between the interventions. Regarding physical function, 12 reviews showed similar results between telerehabilitation interventions and usual care, with low to moderate evidence.28,35–45 However Laver et al46 found insufficient evidence to determine the effectiveness of telerehabilitation on functional variables (see Fig. 3).

With regard to the quantitative analysis, the MMA of physical function revealed a statistically significant but negligible effect size in 6 reviews in favor of telerehabilitation (SMD = 0.18; 95% CI = 0.03–0.34; *P* < .001) and without evidence of significant heterogeneity (*Q* = 4.96, *P* = .04, *I*² = 0%) (Suppl. Fig. 3). The shape of the funnel plot...
Table 2. Quality Assessment Scores

| Study                | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | Score |
|---------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|-------|
| Agostini et al      | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 0  | 0  | 13  | 24   |
| Appleby et al       | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 12  | 22   |
| Chan et al          | 2 | 2 | 0 | 2 | 0 | 2 | 2 | 2 | 0 | 2  | 2  | 2  | 10  | 20   |
| Chen et al          | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 11  | 26   |
| Cori et al          | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 12  | 22   |
| Cotelli et al       | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Cottrell et al      | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Grona et al         | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Huang et al         | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Jiang et al         | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Johansson and Wild  | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Laver et al         | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Laver et al         | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Lundel et al        | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Ownsworth et al     | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Pastora-Bernal et al| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Rintala et al       | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Rintala et al       | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Schröder et al      | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Shukla et al        | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Tchero et al        | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Wang et al          | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |
| Wu et al            | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 13  | 24   |

*1. Explicitly described to allow replication (ie, 100% confident that you could replicate it). If explained but you cannot be 100% confident of replication = in part; 2. Adequate number and range of databases. 3. Alternative searches. 4. Adequate range of key words. 5. Non–English-language papers included in the search. 6. Explicitly of quality assessment criteria described to allow replication. 7. Excludes reviews that do not adequately address inclusion. 8. Two independent reviewers assessing selection bias. 9. Explicitly of quality assessment described to allow replication? 10. Meta-analysis conducted on only homogenous data or limitations to homogeneity discussed. 11. CI/effect sizes reported where possible. 12. Conclusions supported by meta-analysis or other data analysis findings (effect sizes, CI, etc) in the review. 13. Conclusions address levels of evidence for each intervention/comparison. Scoring: 2 = yes; 1 = in part; 0 = no.

Discussion

The results of this review showed that telerehabilitation offers positive clinical results and similar conventional face-to-face rehabilitation approaches regarding physical function, with very low to moderate-high evidence in patients with neurological and musculoskeletal conditions, but was unclear for patients with cardiac and respiratory conditions. In addition, results of the quantitative analysis did not show differences between both interventions and showed statistically significant results in favor of telerehabilitation regarding physical function in patients with neurological disorders.

Regarding the results shown in the MMA, differences in the type of patient targeted for rehabilitation were found. In the case of neurological disorders, the main condition studied was stroke. However, the reviews that assessed cardiorespiratory and musculoskeletal telerehabilitation presented greater variability in the included conditions, which could influence the results.

Therefore, it seems that telerehabilitation could be a better treatment option in patients with neurological conditions, although further research would be needed to investigate its effectiveness in other types of disorders. In this regard, some aspects of telerehabilitation may be particularly positive in patients with neurological disorders compared to patients with cardiorespiratory and musculoskeletal conditions. First, patients with neurological disorders usually require high doses of treatment to obtain functional improvements. This is difficult to achieve through face-to-face interventions because of lack of time; however, telerehabilitation would facilitate increasing the intervention time. Second, telerehabilitation allows training of functional tasks in the patient’s usual environment rather than in clinical settings, favoring their transfer to daily life, a fundamental aspect in patients with neurological pathology.

There are, however, a number of barriers and obstacles that still need to be considered. Despite the theoretical advantages of telerehabilitation over conventional rehabilitation, few studies have evaluated patient satisfaction or acceptance of this type of rehabilitation, and those studies have found conflicting results for this variable. Further studies are needed to evaluate the cost-effectiveness of this rehabilitation model, the barriers encountered by patients when performing telerehabilitation, and the patients’ acceptance of the model. Most of the included studies used telerehabilitation systems based on telephone contact or video conferencing. However, a number of these systems employed more complex technologies that required virtual-reality devices or inertial sensors, requiring patients to have sufficient infrastructure to perform the therapy, which can be difficult and increase costs because of the more complex technologies, which limits access to telerehabilitation services. In addition, health professionals also need adequate training to properly use these technologies.
Some patients targeted for this type of rehabilitation are cognitively impaired, which can also hinder the clinical transfer of telerehabilitation. Aspects such as privacy and data protection also need to be considered when applying this rehabilitation model.

One of the critical elements of telerehabilitation is that it requires patients to be involved and committed to therapy to ensure compliance with the intervention. Establishing strong therapist-patient relationships through online technology requires a patient-focused telerehabilitation, with proper communication and the establishment of objectives and tasks through joint decision making. Peretti et al. suggested that one of the limitations of telerehabilitation is patient skepticism about remote interaction with therapists, thereby necessitating further research and teaching efforts on this therapeutic approach.

It is also imperative to consider the patient’s perspective, given that individuals might be distrustful of telerehabilitation because of their discomfort with using new technologies, their lack of knowledge, and their negative expectations regarding
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It is necessary to increase patients’ confidence through educational strategies implemented by health professionals or through technological training before starting the rehabilitation. As a number of studies have suggested, the perceived benefit of using technology, in addition to receiving appropriate technical support, appears to affect the patient’s engagement in telerehabilitation. Social education is therefore needed to standardize and enhance the value of telerehabilitation as a safe and effective model in health care, and health professionals and health authorities need to be involved.

Limitations
This study presents a number of limitations. First, many of the included studies presented low methodological quality and a high risk of bias. The results should therefore be analyzed with caution. Second, there was considerable variability between the systematic reviews in terms of the interventions as well as the end points used for the evaluation. It was also not possible to conduct a quantitative analysis on certain variables because of the paucity of comparable studies. Last, the quantitative results of the MMA have shown the presence of high heterogeneity, which should be considered an important limitation. Future studies should study the efficacy of telerehabilitation with greater methodological rigor, as well as studying its effect on other populations such as pediatric patients or patients with cancer.

Conclusions
The results of the present review showed that telerehabilitation offers positive clinical results regarding physical function and even comparable with conventional face-to-face rehabilitation approaches, especially in patients with neurological conditions. The advantages of lower cost and less interference by the rehabilitation processes in patients’ daily life could justify implementing telerehabilitation in clinical settings in the coronavirus disease 2019 era.

However, it must be borne in mind that prescribing exercise in patients is a complex process and requires advanced therapeutic skills to increase adherence and effectiveness such as patient education and communication. For this reason, adapting telerehabilitation to the usual practice of physical therapy has to be achieved through a change of paradigm to ensure an effective patient-based telerehabilitation.

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Systematic Review Registration
This meta–meta-analysis was not registered.

Disclosures
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