Effects and patients’ experiences of telerehabilitation at home after shoulder joint replacement

Eriksson L., Ekenberg L., Gard G., Lindström B., Lysholm J.

Purpose: To evaluate effects and experiences of patients who had undergone a shoulder joint replacement and participated in physiotherapy at home via video communication in real time.

Relevance: To achieve an optimal outcome after a shoulder joint replacement and access to a physiotherapist with specific knowledge about the shoulder. Knowledge of the specific rehabilitation and need of observing and guiding the patient from long distances were the background factors to this project.

Description: A total of 22 patients were included in one quantitative and one qualitative study. The patients were selected from the waiting list for a shoulder replacement at a hospital. A controlled study (n=22) with a telerehabilitation group (TR-group), (n=10) participated in training at home under supervision of a physiotherapist at the hospital. Two months of individual exercising via image and sound technique was carried out. A three-part-video meeting with the patient, the physiotherapist at the hospital and the outpatient physiotherapist was arranged at the end of the exercise period. The control group (C-group) was referred to physiotherapy training in a conventional way in their home town.


Evaluation: Tests and measuring of pain, shoulder function ability and health related quality of life and qualitative interviews of the patients were carried out. Two months after surgery, members of the TR-group had participated in more physiotherapy sessions (p<.001) and showed significantly better recovery regarding shoulder pain (p<.001), shoulder joint external rotation (p=.002), shoulder function and activity limitations (p<.001) and in two dimensions of health-related quality of life (p=.004 and p=.001) compared to the C-group. All TR-group participants expressed that they were satisfied with the rehabilitation and that they had experienced the technique as safe. From the qualitative content analysis of the interviews six categories of the participants’ experiences were revealed: 1. An odd reinforced communication; 2. Pain-free exercising as an effective routine; 3. From dependent patient to a strength person at home; 4. Closeness at a distance; 5. Facilitated daily living; 6. Continuous physiotherapy process. The emergent theme: Access to continuous specific physiotherapy at home is a prerequisite for recovery competence.

Conclusions: Interactive video-based physiotherapy at home after shoulder joint replacement was experienced beneficial by the participating patients and seemed more effective than conventional post-discharge rehabilitation procedures concerning short-time recovery. This could be explained by the access to a physiotherapist with specific knowledge of shoulder. The interviews also indicate that the modality might have promoted continuity, patient participation and patient self-efficacy. Research in the form of randomised controlled trials with blind assessments of outcome variables, comparisons of experiences of participants in telerehabilitation and standard procedure therapy would be of value to further investigate the properties of telerehabilitation approaches.
**Implications:** The findings indicate that telerehabilitation approaches might be of great value in the development of physiotherapy practice in order to increase accessibility and the use of patient's own home as an arena for the rehabilitation.

**Patients and physiotherapists satisfaction of in-home telerehabilitation for postknee**

*Tousignant M., Moffet H., Boissy P.2, Corriveau H., Cabana F., Marquis E.*

**Purpose:** The purpose of this study was to investigate the satisfaction of the participants and health professionals of in-home teletreatment as an alternative to face-to-face therapy for individuals at home following discharge from an acute care hospital after total knee arthroplasty (TKA).

**Relevance:** Results of exploratory studies on teletreatment without control group support feasibility of in-home teletreatment. However, little is known about the satisfaction of the participants receiving teletreatment of physiotherapy or health professional who delivered the services.

**Participants:** This study is embedded in a controlled trial aiming at exploring efficacy of in-home teletreatment for TKA. People who had TKA were recruited prior to discharge from two acute care hospitals, the University Hospital of Sherbrooke (UHS) and the University Hospital of Quebec (UHQ).

**Methods:** The design was a randomised trial. Both interventions (teletreatment and home care/outpatient clinic) focused on functional rehabilitation. The teletreatments were delivered to the participants at a rate of two sessions per week for eight weeks. The home visit/outpatient clinic treatments were delivered as usual over a period of two months on average, and the number of sessions was not controlled by research procedures but took place as usual in home care/outpatient clinic services. Dependent variables were: 1) Home telehealth perception questionnaire; 2) Health care services satisfaction questionnaire; and 3) Technical quality subjective appreciation by health professional questionnaire.

**Analysis:** Telehealth perception change was computed with a Wilcoxon signed rank test for two independent samples. The same test was used to compare the level of satisfaction with telemedicine between participants and physiotherapists. In order to compare satisfaction levels between intervention groups, a U of Mann-Whitney for independent sample was computed.

**Results:** The original 48 participants were randomised into two groups: TELE and COMPARISON. The analyses for the current study have thus been completed on a total of 42 participants. Patient's perception of in-home teletreatment was positive at the time of the installation (81.2 ± 7.2 %) as well as at the time of uninstallation (83.4 ± 8.3 %). Satisfaction towards health care services provided was also high for both groups: TELE=90.2 ± 10.0; COMPARISON=90.5 ± 11.2; (p=0.92). The physiotherapists found the technological environment reliability to be satisfactory 46% of the time and good 55% of the time. The professionals evaluated the voice/image synchronization to be satisfactory 14% of the time and good 86% of the time, the refresh rate of the images to be satisfactory 23% of the time and good 77% of the time.

**Conclusions:** In conclusion, level of satisfaction is as high as that of the subjects receiving traditional physical therapy. The physical therapy professionals' satisfaction was also high.

**Implications:** At-home telerehabilitation thus seems to be a promising alternative to traditional face-to-face treatments.
Evaluating the quality of an on-going clinical trial on the effectiveness of Telerehabilitation service after knee arthroplasty: a one-year summary

Moffet H., Tousignant M., Nadeau S., Mérette C., Boissy P., Corriveau H., Marquis F., Cabana F., Ranger P., Belzile É., Dimentberg R.

Purpose: To verify the quality of study conduct and collected data one year after the onset of a multicentre clinical trial.

Relevance: Finding a cost-effective alternative to home physiotherapy visits for post-surgical rehabilitation following knee and other orthopedic surgeries is a major issue considering the increasing need for home care services and shortage of health resources. In 2009, our research group began a non-inferiority clinical trial aiming to verifying if an in-home telerehabilitation approach is as effective as a face-to-face home visit approach after hospital discharge in persons with total knee arthroplasty (TKA). After one year, a summary of the quality of the study conduct and the data collected was made to ensure that adequate procedures were in place.

Participants: From July 2009 to July 2010, 100 persons were recruited in 3 different geographical regions of the Province of Quebec and were evaluated preoperatively. After TKA, 77 of them were randomized just before hospital discharge.

Methods: Participants were randomly assigned to 2 groups: the Telerehabilitation group and the Face-to-face home visits group. Both groups received the same rehabilitation intervention (16 supervised exercise sessions) over the 2 first months after hospital discharge. Participants were evaluated 4 times by a blind evaluator: before TKA (E1), at discharge (E2), 2 months (E3) and 4 months (E4) post-discharge. The primary outcome measure was the WOMAC questionnaire at E4. Secondary measures included: Costs, KOOS questionnaire, Six-minute walk test, Timed Stair Test, Range of knee motion, Muscle strength and Patient Satisfaction. Data collected were entered regularly into a data base (ACCESS).

Analysis: Participant flow through each stage of the trial was done and conformity to the planned protocol was verified (timing, compliance with the evaluations, interventions). The quality of the collected data was also verified. Descriptive statistics for the different outcomes were calculated to detect any unexpected discrepancy between regions or evaluation times.

Results: At the time of this report, 291 evaluations were performed (E1: 100; E2: 77, E3: 65; E4: 49) and only 7 evaluations (E3: 3; E4: 4) were missed by 4 participants. Time intervals between hospital discharge and evaluations matched the planned protocol (E2: 0,9±1,5 days; E3: 61,0±5,2 days and E4: 116,6±11,4 days). E1 was performed within the preceding month of TKA (E1: 8,9±8,4 days). Most of the participants (93%) attended 15 or 16 intervention sessions within the target period. Missing data were very scarce and non applicable items were mainly found for the WOMAC (section C) at E2 and KOOS (section C). Descriptive statistics confirm the plausibility and the similarities of the data collected in the three regions.

Conclusions: This report shows the importance of data monitoring and study conduct analysis during the course of a large-scale trial. By identifying the areas for improvement, the validity of future conclusions is reinforced.

Implications: The demonstration that an alternative approach such as telerehabilitation, is as effective as face-to-face rehabilitation has many implications for future physiotherapy service delivery. It is essential to ensure the quality of such trials to draw strong conclusions.
Implementation of a telerehabilitation program in a EHSD model of care for persons with a stroke

Turolla A., Jørgensen H.R., Piron L., Pedersen M., Agostini M., Larsen T.

Purpose: The increasing number of survivors following acute events such as stroke is enlightening new needs to guarantee appropriate care and quality of life support at home. A potential application of telerehabilitation is to deliver home services. The World Health Organisation (WHO) Europe Regional Office considers as a critical issue in Western-countries the fragmented delivery of health and social services. Research on this topic has been called at the last European Community Call HEALTH-2007-3.1.6: Continuity of Clinical Care. Within an already running Early Home Support Discharge (EHSD) project model for persons with stroke we implement a telerehabilitation approach to find out: in which specific situations telerehabilitation enriches the home treatment; if it is feasible to use the telerehabilitation gear in patients home; tendencies concerning the effect of training in relation to improvement in arm function. The aim of this study is to use an advanced telerehabilitation system in the context of an integrated home care (IHC) service.

Relevance: A Danish HTA shows that EHSD improved the ADL function and reduces both the time of stay in hospital and the risk of hard endpoint. Empowerment of the EHSD model is encouraged by means of an already tested telerehabilitation approach, in order to improve functional patients outcomes with a resulting better allocation of resources and saving costs.

Description: The EHSD model provide an enrolment at 10 days from the stroke event for persons meeting the following criteria: 25<age<85 years, living in a participating municipalities, Fugl-Meyer Upper Extremity (F-M UE)>0, De Renzi Test>62, Albert Test=36, Mini Mental State Examination (MMSE)>24. Mental illness, dementia, severe language disturbances, pregnancy, former acquired brain injury and transfer to another unit were considered as exclusion criteria. In the EHSD program 8 home-therapy sessions were provided during the in-charge time (hospital stay included), with at minimum 2 sessions provided after the hospital discharge. We implement the tele-treatment (based on the remote control of an already tested virtual reality device for motor treatment) in the month after hospital discharge, at minimum 1h/3 times/w.

Evaluation: Primary outcomes: overall mortality, hospital readmission rate, costs, EQoL, interview addressing acceptability, usability and feasibility. Secondary outcomes: F-M UE, Reaching Performance Scale, MMSE, Ashworth and FIM.

Conclusions: We expect that an enriched EHSD model can be accepted by patients and caregivers improving functions and saving costs.

Implications: Analysis of the impact of already tested therapeutic devices on the homecare of persons with a stroke, by means of both clinical and economics outcome, allow to lead a rational approach to the empowerment of service delivery, in a bio-psycho-social framework.