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Effectiveness of supervised physiotherapy versus a home exercise program in patients with distal radius fracture: a randomized controlled trial with a 2-year follow-up

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Abstract

Objective To determine in the long term whether supervised physiotherapy is more effective than a home exercise program for functional improvement and pain relief in patients with distal radius fracture (DRF).
Design Randomized controlled trial.
Setting Rehabilitation hospital.
Participants A total of 74 patients older than 60 years with extra-articular DRF were randomly allocated into two groups.
Interventions The experimental group received 6 weeks of supervised physiotherapy ($n = 37$) and the control group received 6 weeks of home exercise program ($n = 37$).
Main outcome measures The primary outcome was wrist/hand function assessed using the Patient-Rated Wrist Evaluation (PRWE) questionnaire; secondary outcomes were the pain visual analogue scale (VAS), grip strength and wrist flexion–extension active range of motion.
Results All patients completed the trial. For the primary outcome, at 6-weeks and 1-year follow-up, the PRWE questionnaire showed a mean difference between groups of 18.6 (95% CI 12.8 to 24.3) and 18.5 points (95% CI 12.7 to 24.2) respectively, these differences are clinically important. Conversely, at 2-year follow-up this effect decreases to 3.3 points (95% CI −2.4 to 9.0). For secondary outcomes, at 6-weeks and 1-year follow-up, in all measurements the effect size range from medium to large. Conversely, at 2-year follow-up only grip strength showed large effect size in favor of supervised physiotherapy, the rest of outcomes did not show difference between groups.
Conclusion At the 6-week and 1-year follow-up, supervised physiotherapy was more effective for functional improvement and pain relief compared with a home exercise program in patients older than 60 years with extra-articular DRF. However, this effect decreases over time, at the 2-year follow-up, only grip strength showed a difference in favor of supervised physiotherapy.
Trial registration Brazilian registry of clinical trials UTN no. U1111- 1249-2492. Registered 17 March 2020.

Contribution of the Paper

- Current evidence has shown controversial results regarding the effectiveness of supervised physiotherapy versus a home exercise program in elderly patients with DRFs.

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- At the 6-week and 1-year follow-up, supervised physiotherapy is more effective for functional improvement and pain relief.
- However, at the 2-year follow-up, only grip strength showed a difference in favor of supervised physiotherapy in these patients.

Keywords: Distal radius fracture; Supervised physiotherapy; Home exercise program; Elderly; Randomized controlled trial

Introduction

In a previous clinical trial, we reported that a supervised physiotherapy program was more effective for improving function in the short and medium term when compared with a home exercise program in patients older than 60 years with extra-articular distal radius fracture (DRF) without immediate complications [1]. On comparing the results of the two treatments at 6 weeks and 6 months follow-up, significant differences were observed in favor of the supervised physiotherapy group in all functional outcomes analyzed [1].

These findings were not consistent with other published clinical trials performed in elderly patients with conservatively treated DRF, where only short-term significant differences in favor of supervised physiotherapy were found for wrist flexion–extension range of motion but no significant differences in pain intensity and wrist function assessed using grip strength and activities of daily living [2,3]. The difference in the eligibility criteria is a factor that may explain the discrepancy in the results reported. While our study only included one subtype of DRF, the other two randomized clinical trials included both intra-articular and extra-articular DRFs, without performing subgroup analysis [2,3]. Regarding the supervised physiotherapy treatment, these studies only provided general descriptions, without reporting the frequencies of treatment.

Despite this, elderly patients are frequently referred to supervised physiotherapy after DRF [4], but the indications for referral are not based on defined criteria [5]. A study on therapy practice patterns of physiotherapists showed that therapeutic exercise was the most frequently used active intervention [6]. Conversely, advice and home exercises were prescribed significantly more often in patients older than 50 years with extra-articular DRF [6]. However, current evidence has shown controversial results regarding the effectiveness of supervised physiotherapy versus an exercise program at home [5,7].

Several studies have demonstrated that physiotherapy may provide benefits in the short term but there is scarce evidence that structured therapy performed under the supervision of a physiotherapist improves long-term outcomes [4]. Therefore, the aim of this randomized controlled trial with a 2-year follow-up was to assess in the long term whether supervised physiotherapy is more effective than a home exercise program for functional improvement and pain relief in patients older than 60 years with extra-articular DRF.

Methods

Design/setting

We conducted a single-blinded, randomized controlled trial with two parallel groups. This research was prospectively registered in the Brazilian Registry of Clinical Trials (UTN no. U1111-1249-2492). Ethical approval was obtained from the Ethics Committee of the Central Metropolitan Health Service of Chile. Patients were recruited between April 2020 and April 2021. There were no changes to the methods after trial beginning. All participants signed a written informed consent form approved by the Ethics Committee. This study was reported according to the Consolidated Standards of Reporting Trials (CONSORT) Statement for Randomized Trials of Nonpharmacological Treatments [8].

Participants

Participants were recruited from the Physiotherapy Department of the Clinical Hospital San Borja Arriaran in Santiago, Chile. Patients were eligible to be enrolled in the study if they were above 60 years of age with an A3 extra-articular multifragmentary DRF according to the AO/ASIF classification system [9]. Diagnosis was performed by an orthopedic surgeon based on the clinical presentation and radiologic studies. All patients underwent conservative treatment with cast immobilization: a primary closed reduction under local anesthesia under the supervision of the resident orthopedic surgeon and then immobilization with an above-elbow cast (long arm cast) followed by a below-elbow cast (short arm cast) over a total time frame of 5–6 weeks. After cast removal, all patients were prescribed acetaminophen (500 mg every 8 hours for 7 days) and referred for physiotherapy.

Exclusion criteria were: 1) patients treated with any type of surgical intervention for the reduction and/or fixation of DRF, such as closed reduction with percutaneous K-wire fixation, open reduction and internal fixation with volar or

dorsal plates (locking or nonlocking) or the use of external fixation; 2) patients with immediate complications after cast removal, such as complex regional pain syndrome [10] or carpal tunnel syndrome [11]; or 3) patients with some degree of cognitive impairment, scoring < 26 points on the Mini-Mental State Test.

Randomization and blinding

Two coordinating researchers were responsible for managing the entire process of each participant from inclusion to end of follow-up. They were blinded to the allocated intervention and treatment provided by the physiotherapists. One of the coordinating researchers (HG-E) was responsible for enrolling the participants in the study, verifying that they met the eligibility criteria. Patients who were deemed eligible received an explanation of the aim and content of the study. After completing consent inform and baseline examination, patients were randomly allocated in block (3:3) to supervised physiotherapy or home exercise program by a validated web-based randomization program (Sortition). Additionally, to ensure allocation concealment, assignments were placed in sequentially numbered, opaque, and sealed envelopes. This procedure was created and administered by another of the coordinating researchers (FA-Q).

Finally, given the nature of the therapeutic interventions studied, blinding of the physiotherapists and participants was not possible; however, the assessors and statistician were blinded to group allocation.

Interventions

Experimental group (supervised physiotherapy)

The experimental group received a face-to-face supervised physiotherapy treatment consisting of 15 minute of active wrist and hand exercises in a whirlpool at a temperature of 34 °C, followed by joint mobilization applied to the radiocarpal joint. During the first 2 weeks, patients received the Maitland technique (grade II or III) at a dose of one cycle per second for 1 minute. In the remaining 4 weeks, the sustained grade I glide Kaltenborn method was performed in both the anteroposterior and posteroanterior directions, in a neutral position with the distal radius stabilized [1]. Finally, three specific exercises based on motor skill training were performed (controlled grip strength exercise with visual pressure biofeedback; reverse dart-throwing exercise with precision of the first interosseous space; and scapular retraction exercise). To avoid pain and muscle fatigue, patients performed short-duration low-intensity exercises. The dose was 8–10 times for each exercise, maintaining the task for 5 second and with 10–30 seconds of rest in between. The program consisted of 12 sessions twice a week for 6 weeks, and the duration of each session was 1 hour [1]. The program was performed by two physiotherapists with ten years of clinical experience in musculoskeletal rehabilitation.

Control group (home exercise program)

In the control group, all patients received an appointment with a physiotherapist, during which they were instructed to perform an exercise program at home based on a previous clinical trial [12]. The exercises were grouped by week: during the first 2 weeks the priority was pain reduction and reduction of edema; after the second week, passive exercises were performed (early active motions without resistance, including finger stretching and spreading exercises, grip strength exercises, forearm stretching, bending and stretching elbow exercises, as well as abduction/adduction and external/internal rotation of the arm); and in the fifth week, dynamic muscle exercises with light resistance were added [12]. This program was performed once a day for 6 weeks and the duration of exercises was 1 hour daily.

Both treatments were performed and supervised by two physiotherapists external to the research team, with a master's degree in manual therapy and more than 15 years of experience in musculoskeletal physiotherapy. No treatment preference was conveyed to the participants. The interventions were standardized prior to the study through one seminar, 6 videos and 2 lecture sessions. In this study we assessed adherence of two forms, for control group was compliance in the perform of the prescribed home exercises (frequency and dose); and for the experimental group was attendance at supervised sessions and compliance in the perform of the exercises in the clinical setting. Finally, adherence and adverse events were monitored during a weekly phone call by a physiotherapist and recorded in the data collection notebook of each participant.

Outcome measures

Two blinded evaluators assessed the outcomes at baseline and end of the 6-week intervention and at 1-year and 2-year follow-ups. They assessed the same proportion of participants in each group. No changes were made to the outcome measures after trial beginning. The evaluators were external to the research team, they were blinded of the type of treatment that the participants received, and to which group they belonged.

Primary outcome measure

The primary outcome was wrist/hand pain and function, assessed using the Spanish version of the Patient-Rated Wrist Evaluation (PRWE) questionnaire [13]. The PRWE has been proven to be a valid and reliable instrument in assessing pain and functional impairment outcomes for all patients with DRF [14]. The minimal clinically important difference (MCID) is 15 points [15].

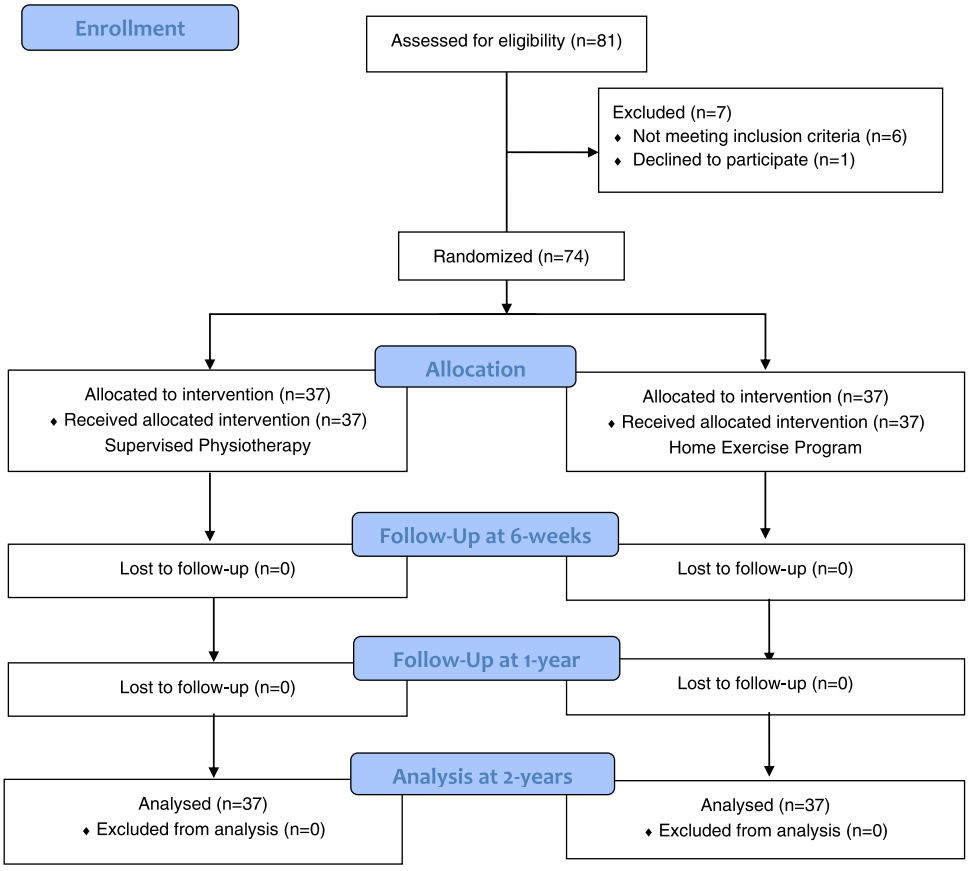

Fig. 1. CONSORT flow diagram.

Secondary outcome measures

The visual analogue scale (VAS) was used to assess pain intensity. The VAS has been shown to be a reliable and valid instrument for assessing changes in pain intensity [16]. A universal goniometer was used to assess wrist flexion–extension active range of motion. This assessment is also recommended for inclusion in the evaluation of all DRF patients [17]. Finally, a Jamar™ dynamometer (model FS660) was used to assess grip strength [18]. This is a valid and reliable instrument for assessing grip function in patients with DRF [19,20]. However, for all these secondary outcomes, the MICD has not been established in patients with DRF treated conservatively.

Statistical analysis

The sample size calculation was based on an MCID of 15 points for the PRWE questionnaire [15]. The assumed mean for the calculation was 18.5 points, with a standard deviation (SD) of 15.9, based on the results of a previous clinical trial [12]. To detect this difference between the two treatments with an alpha (α) value of 0.05 and a statistical power (1 – β) of 95%, a minimum of 30 participants per group was needed. This minimum sample size estimate was increased by 20% after considering potential dropouts or withdrawals, giving a final total of 37 participants in each group.

The data were analyzed using SPSS 24 software. Descriptive statistics were used to describe the demographic and clinical characteristics of the participants and other potentially confounding variables. Continuous variables were presented as the mean and standard deviation, and categorical variables were presented as the number and percentage. To determine the statistical tests for use in data analysis, we used both the Shapiro-Wilk statistical test and graphical (normal probability plot) procedures.

For normal distribution, repeated-measures analysis of variance (ANOVA) was used to compare the PRWE, VAS, grip strength and wrist flexion–extension active range of motion scores within each group, and for the difference between groups at the 6-week, 1-year and 2-year follow-ups, Bonferroni post hoc correction was used. Additionally, for secondary outcomes the MCID are not established, therefore, we calculated Cohen´s *d* for the effect size (ES) of the treatments, considering the effect as trivial (< 0.2), small (0.2–0.5), medium (0.5–0.8) or large (> 0.8) [21]. Finally, in this study, researchers decided to conduct a "per protocol statistical analysis" because no data were missing, the results of all patients are included. The significance level was set at $p < 0.05$.

Results

Compliance with the trial protocol

A total of 74 patients was recruited, as planned. All enrolled participants met the eligibility criteria. All primary and secondary outcomes were reported according to the registered protocol.

Flow of patients through the study

Inclusion of patients started in April 2020 and the last patient completed the trial in April 2021. A total of 74 patients (37 in the experimental group and 37 in the control group) were recruited, as described in the CONSORT flowchart (Fig. 1).

Characteristics of the trial patients

The baseline characteristics of each group are presented in Table 1. All the patients received treatment according to their group allocation and no dropouts were registered. Regarding treatment adherence, in the experimental group, two patients (5%) did not attend two sessions. All absences were because of health problems not directly related to DFR. Despite this, all patients completed the assigned treatment schedule. Regarding the adherence to the control group, one patient (3%) did not perform the prescribed frequency and dose of the home exercises; all other participants performed the home exercise program as prescribed.

Table 1
Baseline characteristics of patients with DRF in both treatment groups.

Characteristics	Supervised physiotherapy group ($n = 37$)	Home exercise program group ($n = 37$)
Age (years), mean (SD)	68.8 (5.6)	69.2 (4.5)
Sex female, number (%)	35 (95)	36 (97)
BMI (kg/m^2), mean (SD)	27.5 (2.4)	27.8 (2.3)
Immobilization time (weeks), mean (SD)	5.5 (0.9)	5.4 (0.9)
Affected dominant hand, number (%)	32 (87)	34 (92)
Radial inclination (degrees), mean (SD)	14.6 (4.3)	14.3 (4.6)
Radial height (mm), mean (SD)	4.5 (1.6)	4.1 (1.6)
Volar angulation (degrees), mean (SD)	9.4 (8.6)	9.2 (9.3)
Ulnar variance (mm), mean (SD)	1.5 (0.4)	1.4 (0.6)
Acceptable alignment of DRF (*), number (%)	25 (68)	26 (70)
Number of comorbidities (diabetes, smoking, or hypercholesterolemia), number (%)		
– **Only one**	7 (18)	6 (16)
– **Two**	15 (41)	16 (43)
– **All the three**	15 (41)	15 (41)
Education level, number (%)		
– **Primary**	5 (14)	4 (12)
– **Secondary**	27 (72)	27 (72)
– **University**	5 (14)	6 (16)

BMI: Body mass index; **DRF:** Distal radius fracture; **SD:** Standard deviation; **(*):** Alignment was considered acceptable if the radial inclination was > 15°, volar angulation was < 20°, radial shortening was < 5 mm, and positive ulnar variance was < 2 mm.

Regarding adverse events associated with both treatments, 1 patient (3%) in the experimental group reported increased pain at the end of the sessions during the first week of treatment. In the control group, 2 patients (5%) reported increased pain at the end of the first 2 weeks of treatment. Research staff reported at ethics committee all adverse events reported by the patient.

Effects of the intervention

All our variables showed normal distribution. Therefore, parametric statistical was used for data analysis. Differences from baseline to the 6-week, 1-year and 2-year follow-ups after intervention are presented in Supplementary Tables S1 and S2.

Primary outcome

Wrist function improved in both groups with treatment, but more so in the supervised physiotherapy group. At week 6, the mean difference between groups for PRWE questionnaire was 18.6 points (ES = 1.4; 95% CI = 0.9 to 1.9; $p < 0.001$). At 1-year of follow-up this effect is maintained to 18.5 points (ES = 1.3; 95% CI = 0.9 to 1.8; $p < 0.001$), these differences are clinically important. Conversely, at 2-year follow-up this effect decrease to 3.3 points (ES = 0.1; 95% CI = −0.2 to 0.5; $p = 0.602$) (see Table 2).

Secondary outcomes

Pain intensity decreased in both groups. At week 6, the mean difference between groups for VAS was 1.9 cm (ES = 1.3; 95% CI = 0.8 to 1.8; $p < 0.001$). However, this effect decreases over time, at 1-year of follow-up was 1 cm (ES = 1.0; 95% CI = 0.5 to 1.5; $p < 0.001$), and at 2-year follow-up this effect decrease to 0.6 cm (ES = 0.2; 95% CI = −0.1 to 1.3; $p = 0.082$), all differences in favor of supervised physiotherapy group with medium to large ES (see Table 2).

Wrist flexion active range of motion increased in both groups. At week 6, the mean difference between groups was 12.3° (ES = 0.9; 95% CI = 0.5 to 1.4; $p < 0.001$). At 1-year of follow-up this effect increased to 18.7° (ES = 1.6; 95% CI = 1 to 2.1; $p < 0.001$), and at 2-year follow-up this effect decrease to 6.9° (ES = 0.7; 95% CI = −0.3 to 1.4; $p = 0.076$) all differences in favor of supervised physiotherapy group with medium to large ES (see Table 2).

Wrist extension active range of motion increased in both groups. At week 6, the mean difference between groups was 20.2° (ES = 1.8; 95% CI = 1.3 to 2.3; $p < 0.001$). At 1-year

Table 2
Supervised physiotherapy versus home exercise program between-group differences at 6-weeks, 1-year and 2-years of follow-up in patients with DRF.

Outcome	Supervised physiotherapy group, mean (SD)	Home exercise program group, mean (SD)	Mean difference between groups (95% CI)	ES (95% CI)	*p*-value (**)
PRWE (points) 6 weeks	27.3 (8.6)	45.9 (15.7)	18.6 (12.8 to 24.3)	1.4 (0.9 to 1.9)	**< 0.001**
PRWE (points) 1 year	14.2 (5.6)	32.8 (14.2)	18.5 (12.7 to 24.2)	1.3 (0.9 to 1.8)	**< 0.001**
PRWE (points) 2 years	1.8 (2.1)	5.1 (3.7)	3.3 (−2.4 to 9.0)	0.1 (−0.2 to 0.5)	0.602
VAS (cm) 6 weeks	1.2 (0.9)	3.2 (1.7)	1.9 (1.3 to 2.5)	1.3 (0.8 to 1.8)	**< 0.001**
VAS (cm) 1 year	0.9 (0.8)	2 (1)	1.0 (0.4 to 1.6)	10. (0.5 to 1.5)	**< 0.001**
VAS (cm) 2 years	0.3 (0.4)	0.9 (0.7)	0.6 (−0.04 to 1.1)	0.2 (−0.1 to 1.3)	0.082
ROM Flexion (degrees) 6 weeks	61.3 (8.9)	49 (15)	12.3 (6.3 to 18.2)	0.9 (0.5 to 1.4)	**< 0.001**
ROM Flexion (degrees) 1 year	72.1 (5.2)	53.3 (15.5)	18.7 (12.8 to 24.7)	1.6 (1.0 to 2.1)	**< 0.001**
ROM Flexion (degrees) 2 years	79.3 (3.9)	72.4 (7)	6.9 (−0.9 to 12.8)	0.7 (−0.3 to 1.4)	0.076
ROM Extension (degrees) 6 weeks	71 (6.2)	50.8 (18.2)	20.2 (14.4 to 26.1)	1.8 (1.3 to 2.3)	**< 0.001**
ROM Extension (degrees) 1 year	77.7 (2.7)	57.9 (15.7)	19.3 (13.8 to 25.5)	1.7 (1.1 to 2.2)	**< 0.001**
ROM Extension (degrees) 2 years	84.1 (2.2)	77.3 (7)	6.8 (−0.9 to 12.7)	0.7 (−0.3 to 1.3)	0.082
GRIP strength (*) 6 weeks	66.3 (9.4)	43.2 (18.2)	23.1 (15.4 to 30.8)	1.5 (1.0 to 2.1)	**< 0.001**
GRIP strength (*) 1 year	81.4 (6.7)	51.8 (22.2)	29.5 (21.8 to 37.2)	1.7 (1.2 to 2.3)	**< 0.001**
GRIP strength (*) 2 years	92.4 (4.9)	81.9 (9.9)	10.6 (2.8 to 18.2)	1.3 (0.8 to 1.8)	**< 0.001**

ES: Effect size was obtained with Cohen´s *d*; **CI:** Confidence interval; **PRWE:** Patient-Rated Wrist Evaluation; **VAS**: Visual Analogue Scale; **ROM**: Range of motion; (*): grip strength was reported as the percentage of the injured wrist compared with the uninjured wrist; (**): *p*-value was obtained with the ANOVA and Bonferroni post hoc correction.

of follow-up this effect maintained to 19.3° (ES = 1.7; 95% CI = 1.1 to 2.2; $p < 0.001$) and at 2-year follow-up this effect decrease to 6.8° (ES = 0.7; 95% CI = −0.3 to 1.3; $p = 0.082$) all differences in favor of supervised physiotherapy group with medium to large ES (see Table 2).

Grip strength increased in both groups. At week 6, the mean difference between groups was 23.1% (ES = 1.5; 95% CI = 1 to 2.1; $p < 0.001$). At 1-year of follow-up this effect increased to 29.5% (ES = 1.7; 95% CI = 1.2 to 2.3; $p < 0.001$), and at 2-year follow-up this effect decreased to 10.6% (ES = 1.3; 95% CI = 0.8 to 1.8; $p < 0.001$) all differences in favor of supervised physiotherapy group with large ES (see Table 2).

Discussion

Our main findings show that after the 1-year follow-up, patients in the supervised physiotherapy group continued to show better functional results than those in the home exercise program. The PRWE questionnaire showed difference clinically important, For VAS, grip strength and wrist flexion–extension active range of motion showed medium to large ES in favor of the supervised physiotherapy group in patients older than 60 years with extra-articular DRF. Conversely, at the 2-year follow-up, only grip strength continued to show differences in favor of supervised physiotherapy; the other outcomes studied did not show significant differences between the treatment groups.

Regarding the effectiveness of supervised physiotherapy and the home exercise program, three systematic reviews have shown that adults with DRF without complications benefitted equally from a home exercise program and instruction, or supervised physiotherapy [5,7,22]. This is important because these studies were unable to demonstrate the clinical benefits of direct supervision of a physiotherapist in the early rehabilitation of DRF. However, these results could be explained by methodological differences between the included studies. Based on our findings, we believe that a standardized therapy performed under the supervision of a physiotherapist is important in the early stages of DRF, where elderly patients need help and support to deal with pain and wrist/hand dysfunction and to perform the exercises adequately.

There are few clinical trials that have studied the effects of physiotherapeutic interventions in patients older than 60 years with DRF treated conservatively [1–4], and only one study reported long-term results [4]. In contrast to our findings, they showed no differences in outcomes between patients who underwent therapy and those who did not, and concluded that physiotherapy may not be necessary for older patients after DRF [4]. In that multicenter international study, therapy was at the discretion of the orthopedic surgeon and physiotherapist of each center, the study lacked clarity as to the therapeutic interventions used in supervised therapy and provided no information related to type and

dose of the exercises or functional activities performed during treatment. Therefore, their results should be interpreted with caution.

Regarding our findings, in both groups for all outcomes studied, the intra-group differences were statistically significant over time. Nevertheless, when the differences between groups were analyzed, at the 6-week and 1-year follow-ups all outcome measures showed differences in favor of the supervised physiotherapy group. Despite this, we observed a decreasing trend in these inter-group differences over time, which is expected because the short- and medium-term beneficial effects of the intervention group have little option for further improvement in the long term. Conversely, in the long term, patients with low scores at baseline tend to improve more than those with high scores. This may explain why most of the mean changes between groups evaluated at the 2-year follow-up did not show clinical or statistically significant differences.

Although the natural history of DRF is poorly understood, understanding the changes in functional status that occur over the first year after DRF may assist in determining the effectiveness of different therapeutic interventions. One study reported decreased wrist range of motion and grip strength 1 year after fracture, with a mean grip strength of 88% with respect to the unaffected hand [23], and 16% of those with DRF continued to report pain and disability even 1 year after injury [24,25]. When comparing these referential data with the values of wrist/hand function and pain registered in our experimental group, we observed that patients in this group presented a higher percentage of grip strength and less disability and pain in the affected hand 1 year after DRF. Interestingly, grip strength was the only functional outcome measure that showed a statistically significant difference at the 2-year follow-up. Unfortunately, the lack of similar published studies does not allow us to compare our findings.

Some authors recommend that for many patients with DRF, performing the normal activities of daily living may be all the rehabilitation required [26,27]. However, this recommendation is not focused on older patients. In this age group, it is difficult to monitor adherence to treatment at home. Elderly patients may not be confident users of technology; additionally, telemedicine interfaces are often not optimized for the vision and hearing declines common in older populations [28]. For these reasons, we decided to incorporate the Mini-Mental State Test as a selection criterion, to thereby ensure that patients in both groups possessed a cognitive level that allowed them to follow the therapeutic indications.

Study limitations

This study has some limitations that should be considered when interpreting our findings. First, we included only patients with extra-articular DRFs without immediate complications after cast removal. Second, blinding of the physiotherapists and participants was not possible because of the nature of the interventions studied. Third, self-report questionnaires were used for the assessment, and these are prone to subjectivity and recollection bias. Four, despite training the assessors and the good validity of the instruments, it was not planned in the trial protocol to calculate inter-rater reliability. Five, despite having long-term follow-up, cost-effectiveness was not assessed because it was not in the original planning of the study. Finally, adherence in the home exercise program group was only assessed through a telephone call, which is a non-reliable method for confirming actual compliance.

Conclusion

At the 6-week and 1-year follow-ups, supervised physiotherapy is more effective for functional improvement and pain relief compared with a home exercise program in patients older than 60 years with extra-articular DRF. However, this effect decreases over time, at 2-year follow-up, only grip strength showed a difference in favor of supervised physiotherapy. Thus, our study has important clinical implications because there are few clinical trials with long-term follow-up in this population. Further studies are needed to support the clinical effectiveness of supervised physiotherapy in these patients.

Ethical approval: The Ethics Committee of the Central Metropolitan Health Service of Chile approved the study protocol (ID: 04811).

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Data sharing statement

There are no data available.

Conflict of interest statement

The authors declare they do not have any potential conflict of interest regarding the investigation, authorship, and/or publication of this article.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.physio.2024.03.005.

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