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Therapist supervised clinic-based therapy versus instruction in a home program following distal radius fracture: A systematic review


 Kristin Valdes OTD, OT, CHT^{a,b,*}, Nancy Naughton OTD, OTR/L, CHT^c, Susan Michlovitz PT, PhD, CHT^d
^a Rocky Mountain University of Health Professions, Provo, UT, USA^b Hand Works Therapy, 744 the Rialto, Venice, FL, USA^c Professional Orthopedics Associates, Scranton, PA, USA^d Cayuga Hand Therapy PT, Ithaca, NY, USA

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ABSTRACT

Purpose: The primary purpose of this systematic review is to determine the effectiveness of a home program or a structured therapy program for patients following distal radius fracture.

Methods: A search was performed using terms wrist fracture, supervised therapy, occupational therapy, physical therapy, splint, orthosis, distal radius fracture, exercise, and home program. Studies that met the inclusion criteria were evaluated for research quality using The Structured Effectiveness for Quality Evaluation of Study (SEQES).

Results: Five of the seven trials found no difference between outcomes for their subjects that had uncomplicated distal radius fractures. The population that has complications following distal radius fractures was not represented in the studies reviewed.

Conclusion: The available evidence from randomized controlled trials is insufficient to support a home program or therapist supervised clinic-based program as a superior method of treatment for adults following a distal radius fracture without complications or the presence of comorbidities.

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Introduction

Distal radius fractures are a commonly seen diagnosis and account for 14% of all fractures.¹ A population based study found that women over the age of 65 who fractured their wrist were approximately 50% more likely to experience a clinically important functional decline compared to women without a wrist fracture, even after accounting for demographic, health, and lifestyle factors.² The effect of a wrist fracture on functional decline was as clinically significant as other established risk factors such as falls, diabetes, and arthritis.²

A prospective randomized study acknowledged that the management of distal radius fractures is extremely variable with no uniform agreement on fracture treatment, classification, or outcome.³ A review of the literature found two systematic reviews that evaluated rehabilitative management of distal radius fractures. The first of the systematic reviews, examined various rehabilitation interventions following predominantly conservative treatment of the fractures

with plaster cast immobilization.⁴ The authors identified fifteen randomized controlled trials. Five trials looked at home program instruction versus a formalized therapy program. One of the studies reviewed was published in 1974 and the newest study was published in 2005. The authors established that there is insufficient evidence to determine most effective interventions for acceptable functional recovery for distal radius fractures.⁴ The second systematic review investigated the role of exercise on impairment and activity following upper limb fractures.⁵ Distal radius fractures were one of the two upper limbs fractures that were studied. Seven studies were evaluated that compared a supervised exercise program to a home exercise program (HEP) following a distal radius fracture. They also found there is insufficient evidence to determine best rehabilitative management following reduction of distal radius fractures.⁵ These reviews looked at the available randomized controlled trials that predominantly excluded patients with complications following distal radius fracture (DRF). It is known that complications following distal radius fracture can affect patient outcomes.⁶ Patient and physician reported patient complication rates following DRF are between 21 and 27%.⁶ It is possible that as many as one in four patients following DRF will incur a complication that can impact their functional outcome. A review that looks at rehabilitation that takes place in the

* Corresponding author. Hand Works Therapy, 744 the Rialto, Venice, FL 34285, USA. Tel.: +1 941 927 6862; fax: +1 941 484 5510.

E-mail address: hotglassgal@comcast.net (K. Valdes).

Table 1
SEQES: Structured Effectiveness for Quality Evaluation of Study scores

Author	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total	
Christensen et al (2000) ¹⁵	1	2	2	2	2	1	1	0	1	0	0	0	1	1	2	1	2	2	1	2	1	1	1	1	1	28
Kay et al (2000) ¹⁶	2	2	2	2	2	1	1	2	1	2	2	2	1	1	2	2	2	1	1	2	2	1	2	2	2	40
Krischak et al (2009) ¹⁶	1	2	2	2	2	1	1	0	1	2	0	2	1	0	2	2	2	1	2	1	2	1	1	1	1	32
Maciel et al (2005) ¹⁷	2	2	2	2	2	1	1	2	1	2	2	1	1	1	2	2	2	2	2	2	1	2	1	2	40	
Souer et al (2011) ¹⁸	1	2	2	2	2	1	1	1	2	2	2	1	1	0	2	2	2	2	1	1	1	1	1	1	34	
Wakefield and McQueen (2000) ¹	2	2	2	2	2	1	1	2	2	2	2	0	1	1	2	2	2	2	2	2	2	2	2	1	2	41
Watt et al (2000) ¹⁹	0	2	2	2	1	1	1	2	1	0	0	2	0	1	2	1	1	1	2	0	1	2	1	2	28	

Key for items 1–24: 1, literature review; 2, comparison of 2 or more groups; 3, patients evaluated at relevant time points; 4, standardized data collection strategy in place; 5, randomization strategy in place; 6, patients blinded to intervention; 7, treatment providers blinded to intervention; 8, evaluator of outcomes blinded to intervention; 9, recruitment strategy in place to gather subjects representative of target population; 10, inclusion & exclusion criteria described; 11, sample size calculation performed; 12, percentage of subjects that completed the study; 13, parameters of the treatment were described; 14, study was designed to minimize treatment provider bias; 15, rationale provided for comparator group; 16, outcome measure, which represented important clinical outcomes, was used; 17, appropriate secondary outcome measures were used; 18, patients were followed at important time points; 19, the statistical tests used to determine whether differences existed due to the intervention were appropriate; 20, power was established; 21, statistical significance and size of the treatment effect was reported; 22, complete data collection was achieved; 23, clinical significance was addressed; 24, specific conclusions and clinical recommendations made by the authors directly related to the objectives of the study.

home or therapy clinic under the supervision of a skilled therapist is needed since the referenced systematic reviews analyzed rehabilitation for patients without complications post-fracture. These reviews are inconclusive, insufficient and difficult to generalize to the patient populations seen in therapy clinics.

The appropriate rehabilitation and treatment following distal radius fracture can facilitate functional gains and prevent long-standing disability. The primary purpose of this systematic review is to evaluate the current evidence for the management of distal radius fractures and more specifically evaluate studies which compared the effectiveness of treatment in two different locations, the home or clinic.

Some of the complications that occur following DRF can include: carpal tunnel syndrome (CTS), finger stiffness, complex regional pain syndrome (CRPS), ligament or tendon damage, arthrosis, and hematoma.⁶ The frequencies reported in the literature for nerve compression following DRF range from 0.3 to 8%. The highest frequency of complications that occur following DRF is reported to be ligament damage at 98%.⁶ Due to the likelihood of complications, the secondary purpose of this paper is to identify if current studies accurately represent the patient population with comorbidities or complications seen by therapists following a distal radius fracture.

Methods

Identification and selection of studies

Inclusion and exclusion criteria for the articles were identified. Inclusion criteria included controlled trials comparing therapy provided in a clinic under the supervision of a therapist to home program provision following distal radius fracture. Trials were excluded if the studies included subjects eighteen years of age or younger and if the studies were published in a language other than English.

Search strategy

A computer search was conducted using the following databases: PubMed and PEDro. Search terms included: wrist fracture, supervised therapy, physical therapy (PT), occupational therapy (OT), splint, orthosis, distal radius fracture, exercise, and home program. Limits were set to exclude articles that included subjects less than 18 years of age. Included studies were limited to those published in English. Two authors (KV, SM) did separate searches and discussed their findings to jointly determine if each paper identified was eligible. Bibliographies of relevant papers were reviewed and additional hand searches were performed to identify

potential additional studies. There were no differences in opinion between the authors completing the search as to which papers would be included.

Participants

The following data were collected on the participants in the intervention groups in each study: number of subjects, age, and type of fracture stabilization (i.e. cast or ORIF). The authors examined the pre-intervention similarity of the subjects in all studies to ensure all subjects were similar. The studies included in this review had no significant differences at baseline between intervention groups.

Interventions

All components of the exercise program (including frequency, duration, exercises performed, provision of handout, and use of compliance diary, equipment used, edema control, skin care, fine motor training, and functional activities) were also compiled. A description of the HEP or therapy, the setting in which the program was performed, and the qualifications of the person administering the intervention were recorded.

Outcomes

Outcome measures that assessed range of motion, grip, and function were examined. Validated self-reported outcome measures used by the researchers included the Visual Analog Scale⁷ (VAS), SF-36,⁸ Patient Rated Wrist Hand Evaluation⁹ (PRWHE), and Disabilities Arm and Shoulder Questionnaire¹⁰ (DASH). Some researchers used the Gartland & Werley¹¹ and the Mayo¹² outcome measures. The Gartland & Werley score is physician assigned based on problems with movement, strength, radiographic changes, pain, and deformity.¹¹ Mayo Wrist Score quantifies outcomes according to the physician assigned score based on pain, grip, and return to work status.¹² The validity and reliability of these measures has not been studied.¹³

Study quality assessment

The quality of the studies was evaluated by the two primary investigators (KV, NN) using the Structured Effectiveness for Quality Evaluation of Study (SEQES)¹⁴ (Table 1). There were no discrepancies in the scores between the reviewers. Developed by MacDermid, the SEQES is a 24-item critical appraisal tool used to evaluate the methodological characteristics of a study.¹⁴ The SEQES score was calculated by totaling the scores of each of the 24 items on the tool. A score of 2 is the highest possible score, a score of 1 indicates a fair rating, and a score of 0 indicates incomplete fulfillment of the criterion. Each of the reviewer's SEQES scores was

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