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Content and Effects of Hand Function Exercises in Patients with Rheumatoid Arthritis: A Scoping Review

Yuqi Liu, Yuexian Tao*, Siying Qiu

School of Public Health and Nursing, Hangzhou Normal University, Hangzhou 311121, Zhejiang, China

Corresponding author: Yuexian Tao, yuextao@outlook.com

Abstract: *Objective*: This study aimed to systematically review and synthesize the current research status, core components of intervention protocols, and outcome measures of hand function exercises in patients with rheumatoid arthritis, in order to provide references for healthcare professionals in developing and implementing related interventions. *Methods*: Following the scoping review framework, a systematic search was conducted in PubMed, Embase, Web of Science, the Cochrane Library, China National Knowledge Infrastructure (CNKI), VIP Database, WanFang Database, and China Biomedical Literature Database (CBM). The search period ranged from 1 August 2015 to 1 August 2025. The identified studies were screened and synthesized according to the inclusion criteria. *Results*: A total of 10 studies were included. The intervention content of hand function exercises comprised joint range-of-motion training, resistance training, and functional training for daily activities, among which joint range-of-motion training and resistance training were the most commonly used. The intervention delivery modes included offline interventions, online interventions, and hybrid interventions. Outcome measures involved three domains: clinical indicators, clinical efficacy, and hand function assessment tools. *Conclusion*: This scoping review analyzed the existing literature and found that hand function exercises can effectively improve hand symptoms and functional outcomes in patients with rheumatoid arthritis, with 12 weeks being a typical intervention duration. However, evidence remains limited regarding exercise duration and patient-reported outcomes. Therefore, further studies are needed to explore their effects on patient-reported outcomes and to consider patients' exercise-related needs and goals.

Keywords: Hand function exercises; Rheumatoid arthritis; Nursing; Scoping review; Rehabilitation nursing

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1. Introduction

Rheumatoid arthritis (RA) is the most common inflammatory arthritis, affecting approximately 0.5% of the global population, and is one of the most disabling joint disorders among adults [1]. It can lead to pain and

functional limitations. To date, no curative treatment is available. Evidence indicates that nearly 80% of patients with RA experience hand function impairment [2]. Current guidelines from the European Alliance of Associations for Rheumatology (EULAR) recommend physical therapy (PT) and occupational therapy (OT) as adjuncts to pharmacological treatment for patients with RA [3,4]. The three most common components of PT/OT are exercise therapy, joint protection education, and the provision of functional splints and assistive devices [5,6]. These findings highlight the importance of implementing effective hand function exercises for patients with RA.

Currently, scholars have comprehensively summarized various methods and assessment tools for hand function exercises in patients with RA, and multiple intervention studies have been conducted [7]. However, substantial heterogeneity remains across existing studies in terms of exercise types, modes of delivery (ranging from fully supervised to completely unsupervised), frequency (from two to three times daily to twice weekly), and duration, with a lack of a unified classification framework and systematic synthesis [8].

Therefore, the primary aim of this study was to conduct a rigorous scoping review to provide valuable insights. Guided by the Joanna Briggs Institute (JBI) methodology for scoping reviews, this study systematically summarizes and analyzes the intervention characteristics of hand function exercises in patients with RA, including content, delivery format, frequency, duration, and outcomes [9]. Furthermore, intervention studies on hand function exercises for patients with RA are synthesized, and their outcome evaluation systems are systematically examined based on the framework of the International Classification of Functioning, Disability and Health (ICF), with the aim of providing an evidence base for the development of standardized intervention protocols and comprehensive evaluation strategies.

2. Methods

This study adopted the scoping review methodological framework proposed by Arksey and O'Malley in 2005, which includes the following steps [10].

(1) Identifying the research question;
(2) Identifying relevant studies;
(3) Selecting eligible studies;
(4) Charting the data;
(5) Collating, summarizing, and reporting the results.

The reporting of this review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines [11]. The PICO framework is presented in **Table 1**.

Table 1. PICO framework

Population	Intervention	Comparison	Outcome
RA	Intervention modalities	Intervention protocols	Hand function
	Inclusion of hand function exercises in the study design	Participant characteristics	Clinical symptoms
	Intervention protocols:		Clinical efficacy
	– Exercise content		
	– Exercise format		
	– Exercise frequency		
	– Exercise duration		

2.1. Step 1: Identifying the research question

To complete the purpose of this study, the following research questions were identified:

(1) What are the specific components of hand function exercises for patients with RA (including exercise content, delivery format, frequency, and duration)?

(2) What are the effects of hand function exercise interventions, and which domains are covered by the outcome measures? What assessment tools are used?

(3) In studies on hand rehabilitation in RA, in what forms are hand function exercise interventions typically delivered?

2.2. Step 2: Identifying relevant studies

A comprehensive search was conducted using a combination of subject headings and free-text terms in the following databases: PubMed, Embase, Web of Science, the Cochrane Library, CNKI, WanFang Database, VIP Database, and CBM. The search period was from 1 August 2015 to 1 August 2025. The Chinese search strategy was as follows: (arthritis OR rheumatoid OR rheumatoid arthritis OR morning stiffness OR RA) AND (hand function exercise OR hand function training OR hand rehabilitation training OR fingers OR rehabilitation training OR finger movement). The English search strategy was developed using PubMed as an example, and the detailed strategy is presented in **Table 2**.

Table 2. Search strategy for the PubMed database

Databases ample		Search strategy
PubMed	#1	((“Arthritis”[Mesh])OR(((rheumatoid[Title/Abstract])OR(rheumatoid arthritis[Title/Abstract])) OR(RA[Title/Abstract])))
	#2	(((finger exercises[Title/Abstract])OR(finger gymnastic[Title/Abstract]))OR(hand function[Title/Abstract]))
	#3	(y_10[Filter]))
	#4	#1AND#2AND#3

2.3. Step 3: Study selection

This study followed the predetermined inclusion and exclusion criteria to guide selection in this scoping review.

2.3.1. Inclusion criteria

(1) Studies involving patients with RA, with clearly defined diagnostic criteria and outcome measures;

(2) Studies focusing on the application of hand function exercises in patients with RA;

(3) Study designs including randomized controlled trials, quasi-experimental studies, cohort studies, and qualitative studies;

(4) Studies published in Chinese or English.

2.3.2. Exclusion criteria

(1) Studies with missing data or inability to obtain the full text;

(2) Duplicate publications;

(3) Publications such as letters to the editor, commentaries, and conference abstracts.

The retrieved records were imported into NoteExpress 4.0 software for deduplication. Two reviewers (YQ and SY) independently conducted the initial screening based on the inclusion and exclusion criteria, followed by full-text review for eligibility assessment. In cases of disagreement, a third reviewer (YX) was consulted to reach a consensus. Cross-checking was performed to determine the final set of included studies.

2.4. Step 4: Charting the data

To extract relevant information from the included studies, a standardized data extraction form was developed, comprising the following categories:

(1) Author
(2) Year of publication
(3) Country
(4) Study design
(5) Sample size
(6) Intervention characteristics (implementer, intervention content, classification of core exercises, delivery format, and duration)
(7) Outcome measures and hand function assessment tools.

The data were extracted independently by two authors (YQ and SY), and discrepancies were eliminated after negotiation. The third author (YT) reviewed all the data.

2.5. Step 5: Collating, summarizing and reporting the results

All extracted data were used for discussion by the research team until they were consistent with the purpose of the scoping review.

3. Results

3.1. Results of study selection

A total of 3,740 articles were initially identified through the literature search. After removing duplicates, initial screening, and full-text screening, 10 studies were finally included. The literature screening flow chart is shown in **Figure 1**.

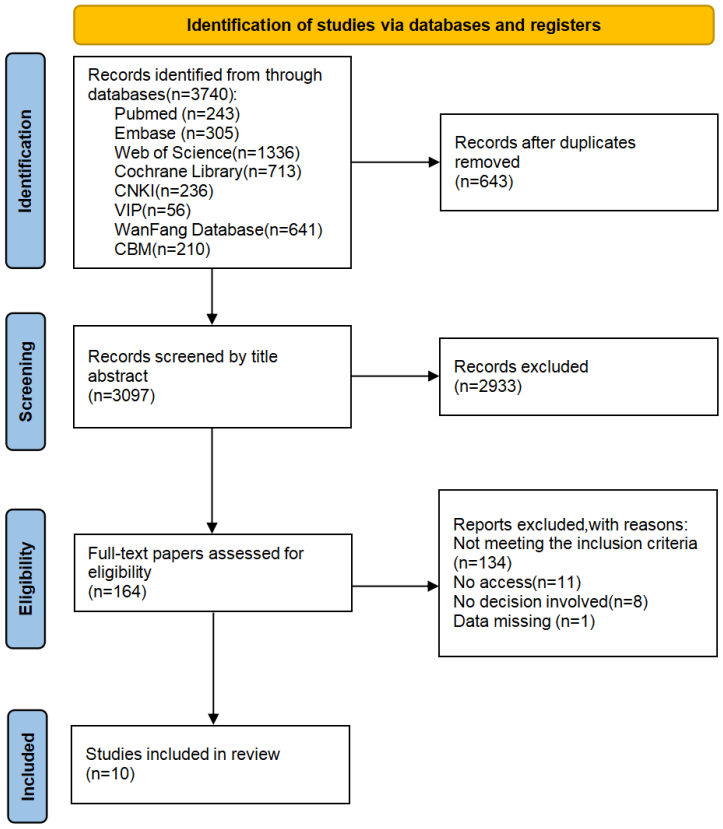

Figure 1. Flow chart of the study selection process.

3.2. Basic characteristics of included literature

A total of 10 studies were included in this review, among which 4 were from China, 3 from the United Kingdom, 2 from Turkey, and 1 from Spain [7.12–20]. The included study types comprised 8 randomized controlled trials and 2 quasi-experimental studies [7.12–20]. According to the data, the total sample size that actually received hand function exercise interventions was 710 participants, with one study having all female participants [19]. The basic characteristics of the included literature are shown in **Table 3**.

Table 3. Basic characteristics of the included studies (n = 10)

Author (Year)	Country	Study design	Sample size		Intervention content					Outcome measures
			Intervention	Control	Implementer	Control group	Intervention content of hand function exercises	Delivery mode	Duration/ Frequency	
Chang [7] (2023)	China	RCT	33	33	Professional coach	Usual care	"Yi Jin Jing" rehabilitation exercise	Online	1 hour per session, 3 times per week, for 12 weeks	ABC DEFG IJKL ②⑤
Li [12] (2018)	China	RCT	25	25	Nurse	Usual care	Eagle claw exercise, fist-clenching exercise, "beckoning wealth" wrist exercise	Offline	20 minutes per session, 2 times per day, for 12 weeks	CDF HMJ⑤

Author (Year)	Country	Study design	Sample size		Intervention content					Outcome measures
			Intervention	Control	Implementer	Control group	Intervention content of hand function exercises	Delivery mode	Duration/ Frequency	
Lu [13] (2021)	China	quasi-RCT	35	36	Nurses, therapists	Usual exercise	Finger flexion and extension exercise, finger opposition exercise, finger adduction exercise, water-based resistance exercise	Offline	30 minutes per session, 3 times per week, for 12 weeks	CD HU ③⑤
Dülgeroğlu [18] (2016)	Turkey	RCT	16	14	Researcher, Physical therapist	Usual exercise	Wrist ulnar deviation, finger fist clenching, finger extension, thumb opposition, rolling a ball on a table, finger radial walking, thumb abduction, non-resistance exercises: wrist flexion/extension, forearm pronation/ supination, thumb opposition, thumb interphalangeal joint flexion	Online+ Offline	2.5-4 minutes per session, 2 times per day, for 10 days	DGIL ① ③⑧
Hall [15] (2017)	United Kingdom	RCT	246	242	Hand therapist	Usual care	Seven flexibility exercises from the SARAH (strengthening and stretching for rheumatoid arthritis of the hand) trial	Online+ Offline	Divided into 6 sessions, approximately 30 minutes each, performed daily at home, for 12 weeks	A② ⑤⑧
Lamb [16] (2015)	United Kingdom	RCT	246	244	Physical therapist or occupational therapist	Usual care	Seven flexibility exercises from the SARAH trial	Offline	20–30 minutes per session, 6 facetoface sessions, with home practice continued for at least 12 weeks	ACD EHIOL ②⑤
Li [14] (2022)	China	RCT	30	30	Physician, nurse	Usual care	Tabletop hand swinging, left-right hand swinging, finger opposition exercise, fist clenching and stretching exercise	Offline	15–30 minutes per session, 2 times per day, for 3 courses, over a total of 18 months	CDGM

Author (Year)	Country	Study design	Sample size		Intervention content					Outcome measures
			Intervention	Control	Implementer	Control group	Intervention content of hand function exercises	Delivery mode	Duration/ Frequency	
Özcelep [19] (2022)	Turkey	RCT	19	21	Therapist	Usual treatment	MCP, PIP, DIP joint range of motion and isometric exercises; washing face, using a fork, drinking from a glass, sitting up, putting on a T-shirt.	Offline	Approximately 45 minutes per session, 2 times per week, for 5 weeks	DI①⑤⑧
Sánchez-LaulhéP [20] (2020)	Spain	RCT	14	22	Researchers, physical therapists, physicians	Usual treatment	Warm-up, range of motion exercises, stretching exercises, strengthening exercises	Online	15–20 minutes per session, 4 times per week, for 12 weeks.	CD②④⑤
Srikesavan [17] (2025)	United Kingdom	quasi-RCT	46	19	Physicians, nurses, occupational therapists, physical therapists	Usual treatment	Online SARAH programme: consisting of 11 exercises (7 flexibility training, 4 strength training).	Online	20–30 minutes per session, 4 weeks (planned duration), but the actual usage and followup time of patients were longer (mean 70 days from baseline to discharge, and 130 days to the 4month followup).	D②

Note: Randomized controlled trial (RCT); quasi-randomized controlled trial (quasi-RCT). ① Duruöz Hand Index (DHI), also known as Cochin Hand Functional Disability Scale (CHFS). ② Michigan Hand Outcomes Questionnaire (MHQ). ③ Signals of Functional Impairment (SOFI). ④ Disabilities of the Arm, Shoulder and Hand questionnaire (DASH). ⑤ Grip strength and pinch strength. ⑥ Grip Ability Test (GAT) and Jebsen Hand Function Test (JHFT). ⑦ Arthritis Impact Measurement Scale 2 (AIMS2). ⑧ Nine Hole Peg Test (NHPT).Clinical indicators:A. Range of motion (ROM).B. Radiographic evaluation.C. Morning stiffness duration.D. Degree of joint pain (VAS/NRS).E. Number of swollen joints.F. Number of tender joints.G. Disease activity score (DAS28-ESR).H. Quality of life.I. Health Assessment Questionnaire (HAQ).J. Anxiety level.K. Depression level.L. Laboratory tests.M. Activities of daily living.N. Rheumatoid Arthritis Pain Scale (RAPS).O. Arthritis self-efficacy (ASES-8/RASE).P. Functional class.Q. Number of deformed joints.R. Finger pain intensity.S. Finger stiffness.T. Limb function (FMA / Carroll).U. Fatigue Severity Scale (FSS).

3.3. Core content of hand function exercise intervention protocols

3.3.1. Classification and modes of hand function exercise movements

In the 10 included studies, the intervention protocols were primarily delivered by nurses and therapists. Based on the synthesis of specific movement content of hand function exercises, this study categorized the intervention modes into the following three types.

(1) Basic training [7,12,14–16,18]

Primarily consisting of active range of motion (AROM) exercises, often supplemented by warm-up/ massage. This mode includes basic AROM and compound AROM. The movement design of basic

AROM aims to cover all major joints of the hand, including the metacarpophalangeal joints, proximal interphalangeal joints, distal interphalangeal joints, and the wrist joint. The movements involve finger flexion, finger extension, finger pressing, finger rotation, finger adduction, finger opposition, as well as multi-dimensional wrist movements such as wrist rotation, ulnar deviation, radial deviation, and palm pressing. Compound AROM training refers to adding combined and sequential movement patterns on the basis of basic AROM, for example the strengthening and stretching for rheumatoid arthritis of the hand (SARAH) exercise, which is also the most common form of hand function exercise intervention, as seen in Hall et al [15]. In addition, some movement designs originate from therapeutic approaches beneficial for the holistic care of patients' physical and mental health. For instance, Chang et al. introduced a complete traditional Chinese medicine exercise method, such as Yi Jin Jing (Muscle-Tendon Change Classic), which contains a large number of complex hand posture changes [7]. However, this type of training demands high movement precision and often requires professional coaches to guide patients during the intervention process.

(2) Resistance training [13,17,20]

Resistance training is added to the basic mode. This mode refers to active, full-range muscle contraction exercises performed by the patient on the basis of basic range of motion training, with external resistance applied manually or with equipment, such as using elastic bands, grip balls, therapeutic putty, etc. The core principle is to activate the patient's own muscle strength to overcome resistance, rather than relying on passive movements delivered by therapists.

(3) Functional training for daily activities [19]

This mode is primarily characterized by the inclusion of task-oriented training. Task-oriented training refers to hand function exercises integrated with activities of daily living or game-based tasks, such as wall-climbing exercises, virtual games, tabletop ball-rolling, and grasping a cup. This approach may help to reduce the strong subjectivity of therapists and compensatory movements by patients commonly observed in conventional rehabilitation training, while also ensuring training precision, thereby contributing to improvements in patients' daily functional performance.

To more clearly present the above classification results, the categorization and distribution of the three modes are summarized in **Table 4**.

Table 4. Profile of finger exercise intervention patterns (n = 10)

Intervention mode	Training content	Number of studies	Percentage
Basic training	Range of motion training, often supplemented with warm-up/massage	6	60%
Resistance training	Range of motion training combined with resistance	3	30%
Daily functional training	Taskoriented training	1	10%

Note: Percentages have been rounded, and the total sums to 100%.

3.3.2. Intervention duration of hand function exercises

There is considerable variability in the time–dose parameters of hand function exercises for patients with RA. Different researchers have adopted varying approaches in terms of repetition frequency and duration per session, which may be related to the specific exercise content. In some studies, a greater number of exercise repetitions were implemented, resulting in longer intervention durations. This highlights the need for future

research to further establish standardized time–dose parameters for hand function exercises.

In contrast to the diversity in intervention modes, the intervention duration demonstrates relatively high consistency. Regardless of whether the interventions were delivered offline, online, or through a combined approach, a 12-week duration was most commonly adopted, as illustrated in **Figure 2**. In addition, one study conducted follow-up assessments ranging from 4 to 12 months after patient discharge [17].

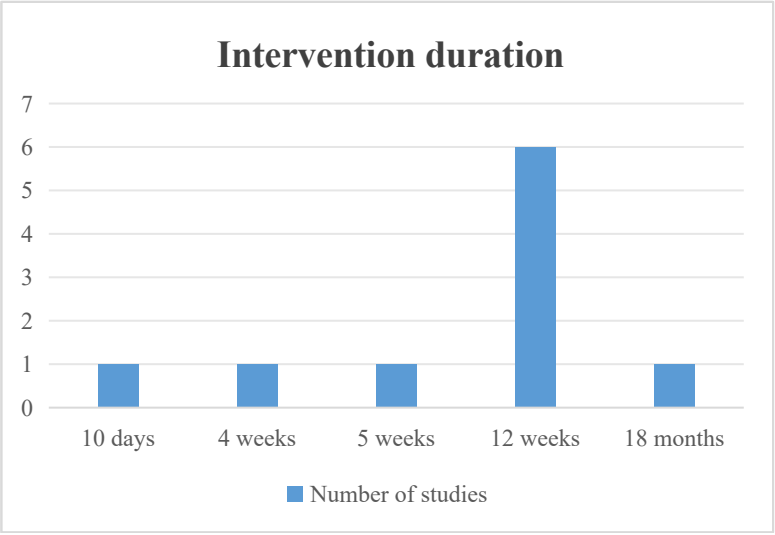

Figure 2. Histogram of intervention duration and number of studies.

3.3.3. Intervention delivery format

(1) Offline interventions [12–14,16,19]

These include face-to-face guidance, providing patients with instructional videos for functional exercises, and requiring the completion of exercise diaries. This is the most commonly used intervention delivery mode. Offline interventions can effectively ensure patient adherence, facilitate healthcare professionals or therapists in monitoring whether exercises are performed correctly, and enable timely responses to patients' disease-related or functional concerns.

(2) Online interventions [7,17,20]

These involve the use of mobile applications, open-access learning platforms, and social forums for treatment delivery and exercise monitoring. Progress in planned interventions and changes in pain intensity are presented in graphical formats, alongside the establishment of check-in mechanisms. Patients can independently download exercise guidelines, training plans, and exercise diaries. This approach is conducive to promoting self-directed training and fostering the habit of home-based exercise; however, when patients perform exercises incorrectly, it is difficult for healthcare professionals to identify and correct them in real time.

(3) Hybrid interventions (combining offline and online approaches) [15,18]

In addition to offline strategies, these include remote supervision of rehabilitation training, provision of exercise videos, and inviting patients to join online communication groups, where healthcare professionals can answer questions and share exercise-related knowledge.

3.4. Outcome measures and intervention effects of hand function exercises

(1) Outcome measures

The outcome measures of the included studies encompassed patients' physical function, such as range

of joint motion, imaging assessments, and duration of morning stiffness, as well as indicators of activity and participation, including quality of life and the Health Assessment Questionnaire. In addition, three studies evaluated patients' psychological status, including anxiety, depression, and self-efficacy [7,12,16].

Grip strength and pinch strength were the most frequently assessed outcomes. Among the 10 included studies, seven reported these measures as primary outcomes, accounting for more than half of the total [7,12,13,15,16,19,20]. Furthermore, it was noted that most studies measured grip strength using electronic dynamometers, while a minority employed non-standard measurement methods. Such as using a mercury sphygmomanometer: the cuff was folded and inflated to 20 mmHg, after which the patient was instructed to grip it with maximal force; the grip strength value was then calculated as the maximum height of the mercury column minus 20 mmHg [21]. Among standardized hand function assessment scales, the Signals of Functional Impairment (SOFI) and the Michigan Hand Outcomes Questionnaire (MHQ) were the most frequently used. One study employed both the Disability of the Arm, Shoulder and Hand (DASH) questionnaire and SOFI to evaluate hand function [18]. In addition, Bremander et al. demonstrated through an 8-year follow-up that changes in the total SOFI score could effectively predict long-term structural joint damage, highlighting the importance of the SOFI scale in assessing hand function in patients [22].

(2) Intervention effects

Basic training has been widely demonstrated to be effective in alleviating joint pain, as reported in studies such as that by Dülgeroğlu [18]. Lu Jun suggested that resistance training may be more effective than basic training; in their study, patients received offline guidance to perform aquatic resistance training in addition to hand function exercises, and the results showed that SOFI scores were significantly lower than those in the control group receiving hand function exercises alone [13]. A meta-analysis including seven studies with a total of 483 patients similarly demonstrated that, on the basis of conventional pharmacological treatment, the addition of structured exercise training can significantly improve overall disease status in patients with RA [23]. From an evidence-based perspective, these findings support the rationale for incorporating active exercise, including hand function training, into RA rehabilitation management, with benefits extending beyond hand function to overall systemic outcomes. The unique value of functional training for daily activities lies in its ability to promote functional generalization and enhance long-term adherence, thereby improving patients' performance in activities of daily living [19]. Regarding improvements in hand grip strength, some inconsistencies were observed among the included studies. Six studies reported improvements in grip strength following intervention [7,12,13,15,16,20]. However, Özcelep indicated that their intervention showed limited effectiveness in improving hand dexterity, and no statistically significant improvement in muscle strength was observed; in particular, no significant change was found in left-hand grip strength before and after the intervention, which may be related to the use of isometric exercises alone [19].

4. Discussion

4.1. Analysis of the sources of heterogeneity in intervention protocols and pathways to standardization

Analysis of the included studies revealed considerable variability in the duration and frequency of exercise interventions, although the intervention period was most commonly 12 weeks. However, some evidence

suggests that short-term exercise (less than 3 months) has limited effects on hand function, whereas medium-term (3–11 months) and long-term (more than 12 months) interventions yield more favorable outcomes [24].

The heterogeneity in intervention duration and frequency may be attributed to several factors. Firstly, some studies lack a unified theoretical framework and a standardized set of core exercises, with intervention designs often based on clinical experience or localized modifications rather than evidence-based development. In this regard, the SARAH program provides a comprehensive functional training framework; Lamb et al. described seven flexibility exercises and four strengthening exercises, and this clarity facilitates the dissemination and implementation of this program [16]. Secondly, there is a lack of research on dose–response relationships, making it difficult to determine the optimal intervention dosage for patients with different levels of disease activity or functional status. Due to the lack of dose-response relationship studies, the optimal intervention dose for patients with varying levels of disease activity or functional status remains unclear. This may be because the effects of functional exercise often require a longer period to be validated, warranting further investigation in future studies.

Future research should focus on establishing standardized pathways and adopting a staged strategy. In the short term, methods such as the Delphi technique or consensus meetings could be employed to bring together experts in rehabilitation, nursing, and rheumatology to reach agreement on core AROM modules and minimum reporting standards for hand function exercises in RA [25]. In the medium to long term, dose–response randomized controlled trials could be designed to explore optimal intervention parameters for patients at different stages of the disease. Based on patients' functional status and rehabilitation goals, stratified and tailored interventions could be developed, matching individuals to different levels of intervention strategies, including basic training, resistance training, and functional training for daily activities.

4.2. Reflection on outcome measures based on the ICF framework and strategies for optimization

At the level of outcome indicators, most of the included studies focused on outcomes corresponding to the "body functions and structures" domain of the ICF, such as grip strength and joint counts, while relatively neglecting the "activity" and "participation" domains. Consequently, aspects such as patients' social roles, self-efficacy, and patient-reported outcomes were insufficiently assessed. This imbalance leads to fragmented evaluations of intervention effectiveness and fails to comprehensively reflect the impact of interventions on patients' overall lives.

With regard to measurement tools for outcome indicators, grip strength, being the most commonly used measure of physical function, has certain limitations. For patients with RA who present with joint deformities or hand swelling, the standard Jamar dynamometer is often difficult to use due to its large size, discomfort during grasping, and inability to accurately detect subtle grip strength [26]. As a result, many studies have resorted to using mercury sphygmomanometers for measurement. However, in current hospital ward settings, electronic sphygmomanometers are more commonly available, while traditional mercury devices are less accessible; consequently, measuring grip strength using mercury sphygmomanometers is more time-consuming and labor-intensive compared to electronic dynamometers. Some researchers have employed electronic handheld dynamometers and accelerometers to assess muscle function in older adults, which may provide new directions for grip strength assessment in patients with RA [27].

Future research should aim to systematically develop comprehensive evaluation frameworks, drawing on established theoretical foundations and using the ICF framework as a central guide. In terms of indicator selection, in addition to conventional physical measures, standardized tools that effectively capture "activity"

and “participation” domains should be incorporated, with greater emphasis on patient-reported outcomes. Regarding tool innovation, there is a need to develop miniaturized and electronic grip dynamometers tailored for patients with RA, or to explore more sensitive and functionally relevant alternative indicators, such as pinch strength and grasping ability. Only through the use of reliable and precise assessment scales and tools for hand function can the true effects of hand function exercise interventions be accurately evaluated, thereby advancing the scientific development of this field.

4.3. Rehabilitation orientation and goals of different intervention models

The three types of models proposed in this study each have their applicable scenarios, as shown in **Table 5**.

Table 5. Applicable patient populations and rehabilitation goals of the three patterns

Intervention mode	Applicable patients	Rehabilitation goals
Basic training	Patients in the early stable phase or with severe functional impairment	Safely maintain joint range of motion, relieve pain and stiffness
Resistance training	Patients in the stable phase with chief complaints of decreased muscle	Alleviate muscle atrophy, improve hand function and independence in daily living
Daily functional training	Patients who exhibit movement compensation during training and whose chief complaint is restoration of daily living	Develop rehabilitation habits and enhance patient motivation

4.4. The value of rehabilitation nursing in hand function training, research limitations and future directions

Hand function training, as a low-cost, low-risk, and easily scalable non-pharmacological intervention, is highly consistent with the core objectives of the nursing profession, namely health promotion and disease prevention. Nurses play an irreplaceable role in patient education, long-term follow-up, and behavioral supervision, and are key implementers in the clinical application and sustained maintenance of hand function training.

This study has several limitations. Some of the included studies had relatively small sample sizes. In addition, during the literature search process, studies primarily focusing on other combined interventions but containing components of hand function exercises may have been overlooked.

Future research may focus on optimizing intervention protocols by establishing standardized exercise modules through the Delphi technique and integrating mobile health technologies. For example, hand exercise applications similar to that designed by Tonga, could be developed to enable remote supervision, personalized feedback, and behavioral motivation, thereby enhancing the precision and sustainability of rehabilitation interventions [28]. Furthermore, a patient-centered evaluation system should be established, with quality of life and functional participation as core outcome indicators. In this way, hand function training can evolve from an experience-based practice into an evidence-based, precise, and nursing-value-oriented core rehabilitation strategy.

5. Conclusion

This scoping review synthesized the current evidence on hand function exercises in patients with RA. The findings suggest that such interventions may contribute to improvements in hand symptoms and functional outcomes, with a 12-week intervention period commonly reported in the literature. However, considerable

heterogeneity remains in terms of exercise dosage, including frequency and duration, and the evidence regarding patient-reported outcomes is limited.

Future research is warranted to further explore the potential impact of hand function exercises on patient-reported outcomes and social participation, as well as to better align interventions with patients' individual needs and rehabilitation goals.

Disclosure statement

The authors declare no conflict of interest.

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