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Research Article

EFFECT OF TASK ORIENTED TRAINING WITH RESISTIVE RESISTANCE EXERCISES ON PAIN, FUNCTIONALITY, GRIP STRENGTH AND QUALITY OF LIFE IN RHEUMATOID ARTHRITIS: A RANDOMISED CONTROL TRIAL

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Abstract

Background: A prevalent chronic autoimmune inflammatory illness that mostly affects the joints, rheumatoid arthritis (RA) can cause pain, stiffness, muscular weakness, or functional impairments. Hand involvement is common or can significantly impair grip strength, hand function, or quality of life. An essential component of rehabilitation is exercise therapy, which comprises task-oriented training or resistive exercises.

Methodology: A randomized controlled trial at Santosh college of Occupational therapy on RA patients aged 30–65 years was conducted. The control group received ROM or therapeutic putty exercises, while the experimental group received task-oriented activities with resistance exercises for 45-minute sessions twice weekly for five weeks. Outcomes were assessed using HAQ-DI, DHI, VAS, grip strength, or pinch strength.

Result: For every outcome measure, both groups showed statistically significant within-group improvements ($p < 0.001$). Comparisons across groups showed that the experimental group outperformed the control group in terms of grip strength on the dynamometer ($p = 0.012$) or pinch gage ($p = 0.042$), as well as considerably higher decreases in HAQ-DI ($p = 0.021$), DHI ($p = 0.041$), or VAS ($p = 0.047$).

Conclusion The addition of task-oriented training to a standard resistive exercise or conventional therapy programme produces significantly greater improvements in pain, functional hand ability, grip strength, or quality of life in individuals with rheumatoid arthritis. These findings support the integration of task-oriented training as an evidence-based adjunct within occupational therapy rehabilitation for RA.

Keywords: Rheumatoid Arthritis, Duruoz Hand Index, Health Questionnaire Index, Range of Motion, Task Oriented Training

1. Introduction

The long-term inflammation of the synovial joints that causes pain, stiffness, swelling, joint destruction, or increasing functional impairment is the hallmark of rheumatoid arthritis (RA), a chronic systemic inflammatory disease. [1]. The tiny joints of the hands or wrists are frequently affected by RA, which can seriously impair grasping, gripping, handling things, or carrying out activities of daily living (ADLs) Muscle weakness, diminished grip strength, compromised functional performance, or a lower quality of life may be caused by persistent inflammation, discomfort, or decreased physical activity [2].

Because hand pain, stiffness, or weakness can interfere with activities including dressing, eating, grooming, writing, or home chores, hand involvement is a significant clinical characteristic of RA [1]. Therefore, limits in day-to-day tasks or loss of independence may result from reduced grip strength or poor hand function. Exercise-based rehabilitation may help people with RA improve their hand function, muscular strength, discomfort, or functional ability, according to recent research.

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People with RA have a lower quality of life due in large part to pain, functional limitations, or diminished physical capacity [2]. It has been demonstrated that exercise therapy enhances functional ability or quality of life in RA patients, making it a crucial part of non-pharmacological treatment [1]. Additionally, exercise therapies may enhance physical performance or lessen discomfort, which supports their inclusion in a thorough RA rehabilitation program [3].

Resistance training is very helpful for treating RA-related muscular weakness or decreased physical capacity. (Athanasiou et al., 2024).While offering a suitable stimulus for preserving physical ability, progressive strengthening activities can enhance muscle strength or functional performance (Zhang et al., 2025). Resistance training is a successful intervention for enhancing strength, physical functioning, pain, or quality of life in people with rheumatic disorders, according to data from randomized controlled trials or systematic reviews.

Task-oriented training (TOT) is an activity-based rehabilitation strategy that emphasizes practicing functional tasks repeatedly with meaning or purpose [4]. TOT enables people to practice exercises that are closely related to their daily routines or functional goals, rather than focusing exclusively on separate movements. By addressing functional limitations through intentional activity practice, task-oriented training may help people with RA execute daily tasks more effectively [4].

In their investigation of the impact of task-oriented training on RA patients, Özcelep et al. (2022) found that including task-oriented training into traditional exercises greatly enhanced hand-related functional capacity [5]. Meaningful actions like using a fork, drinking from a glass, cleaning one's face, sitting up, or putting on a shirt were all part of the intervention. These results imply that adding meaningful activities to therapy may improve functional performance in RA patients.

There is little data on how task-oriented training or resistance training together affect RA patients' pain, functionality, grip strength, or quality of life, despite prior research showing the advantages of both for functional performance or strengthening muscles (Zhang et al., 2025). Task-oriented training combined with resistance exercises can help with both activity-level limits that affect daily task performance or impairment-level issues like decreased muscle or grip strength [4, 5]. Thus, more research into a multimodal rehabilitation method is necessary.

Thus, the current study is to assess how task-oriented training in conjunction with resistance exercises affects rheumatoid arthritis patients' pain, functionality, grip strength, or quality of life. The goal of the study is to ascertain whether physical function, hand strength, discomfort, or general quality of life may all be significantly improved by this combination intervention.

2. MATERIALS AND METHODS

2.1 Study Design or Setting

IEC at Santosh College of Occupational Therapy in Ghaziabad examined, debated, or approved a prospective, randomized controlled experiment (RCT). **(Ref. No.- SCOT/JULY-25/EC-ORTHO-01).** All participants provided written informed consent prior to inclusion.

2.2 Participants

Subjects were adults between the ages of 30 and 65 who had received a clinical diagnosis of rheumatoid arthritis (RA) for a minimum duration of one year. Individuals were required to have the mental capacity to understand or follow the instructions provided during the study or to be functionally capable of participating in the intervention. Participants with functional capacity Class I–II were included. Individuals with a Visual Analog Scale (VAS) score greater than 7, indicating severe pain, were excluded. Other exclusion criteria included severe mental illness such as major depression or schizophrenia, cardiovascular conditions, or any previous upper-extremity orthopaedic, neurological, or other surgical procedures.Using a straightforward random sample procedure, 40 participants were either recruited or randomly assigned to the experimental or control groups.

2.3 Intervention

Experimental Group (EG):Receives traditional occupational therapy, therapeutic putty exercises, or task-oriented training. Functional exercises like cleaning one's face, using a fork, drinking from a glass, getting up from a chair, or putting on a T-shirt were all part of task-oriented training, which was done 30 times [4]. Squeezing, pinching, finger abduction, or thumb abduction were among therapeutic putty exercises that were done for ten to fifteen repetitions with three to five-second holds. ROM exercises for the jaw, neck, shoulder, elbow, forearm, wrist, or fingers were part of conventional therapy. For five weeks, treatment was administered twice a week for forty-five minutes each time.(Hmamouchi et al., 2015).

Control Group (CG): Received traditional occupational therapy or therapeutic putty exercises, just like the experimental group, but without task-oriented instruction. For five weeks, treatment was administered twice a week for forty-five minutes each time.

2.4 Outcome Measures: In patients with rheumatoid arthritis (RA), the Visual Analog Scale (VAS), a 10-cm scale that ranges from 0 (no pain) to 10 (worst possible pain), has shown strong validity or test-retest reliability (Hmamouchi et al., 2015). Grip strength is a crucial predictor of hand function or handicap in RA patients, or the Camry Hand-Held Dynamometer is a

portable tool that measures it objectively in kilograms (Higgins et al., 2018). The Duruöz Hand Index (DHI) is a self-report questionnaire with strong validity or reliability that is used to evaluate hand function or disability in people with RA (Poole et al., 2006). The Pinch Gauge is a tool that helps evaluate hand function in people with RA by objectively measuring pinch strength, including key, palmar, or tip pinch (Incel et al., 2006). Patients with RA are evaluated for functional disability during daily activities using the Health Assessment Questionnaire Disability Index (HAQ-DI), a self-reported questionnaire (Teuwen et al., 2024).

2.5 Statistical Analysis:

Forty people with rheumatoid arthritis from Santosh Medical College or Hospital or Sri Balaji Action Medical Institute in Ghaziabad participated in a randomized controlled experiment. DHI, HAQ-DI, VAS, hand grip dynamometer, or pinch gage were used for pre- or post-intervention evaluations after a five-week intervention. SPSS version 26 was used to analyze the data. For within-group or between-group comparisons, respectively, the Wilcoxon Signed-Rank or Mann-Whitney U tests were employed; $p<0.05$ was deemed statistically significant.

3. RESULTS

Table 3.1: Demographic Characteristics

The demographic data indicated that both groups were comparable at baseline. The mean age was similar between the control group (35.55 ± 5.68 years) orthe experimental group (34.10 ± 6.91 years), as presented in Table 1.

Variable	Control Group (n=20)	Experimental Group (n=20)
Age (years)	35.55 ± 5.68	34.10 ± 6.91
Gender		
Male	5 (25%)	6 (30%)
Female	15 (75%)	14 (70%)

Table 3.2: Baseline Comparison of the outcome variables:

The pre- or post-intervention comparison showed changes in the outcome measures (DHI, HAQ-DI, VAS, dynamometer, or pinch gauge) following the intervention. The statistical significance of these changes was assessed using the Wilcoxon Signed-Rank Test, with $p < 0.05$ considered statistically significant.

Table 3.2: Baseline Comparisons of the outcome variables:

Scale	Control Group	Experimental Group	t Value	P Value	Interpretation
PRE-DHI	Pre-test DHI	Pre-test DHI	0.285	0.777	No statistically significant difference
PRE-HAQ-DI	Pre-test HAQ-DI	Pre-test HAQ-DI	-0.812	0.422	No statistically significant difference

PRE-VAS	Pre-test VAS	Pre-test VAS	-1.989	0.054	No statistically significant difference
PRE-Dynamometer	Pre-test Dynamometer	Pre-test Dynamometer	1.287	0.206	No statistically significant difference
PRE-Pinch Gauge	Pre-test Pinch Gauge	Pre-test Pinch Gauge	-0.215	0.831	No statistically significant difference

Table 3.3: Post-Intervention Analysis of the outcome variable:

The post-Interventional comparison shows statistically significant differences between the control or experimental groups across all outcome measures, as all p-values are less than 0.05. This indicates that the experimental intervention was more effective in reducing pain or disability (DHI, HAQ-DI, VAS) or improving strength (dynamometer or pinch gauge) compared to the control group.

Scale	Control Group	Experimental Group	t Value	P Value	Interpretation
POST-DHI	Post-test DHI	Post-test DHI	0.842	0.0405	Statistically significant difference
POST-HAQ-DI	Post-test HAQ-DI	Post-test HAQ-DI	2.418	0.021	Statistically significant difference
POST-VAS	Post-test VAS	Post-test VAS	-0.732	0.0468	Statistically significant difference
POST-Dynamometer	Post-test Dynamometer	Post-test Dynamometer	1.589	0.012	Statistically significant difference
POST-Pinch Gauge	Post-test Pinch Gauge	Post-test Pinch Gauge	0.228	0.0421	Statistically significant difference

4. DISCUSSION

Task-oriented training (TOT) in conjunction with resistive exercises or range-of-motion therapy significantly improved hand function, disability, pain, grip strength, or pinch strength compared to conventional therapy alone, according to this randomized controlled research. These results corroborate the additional advantages of occupation-based, task-specific practice for rheumatoid arthritis (RA).

The results of Özçelep et al. (2022), who observed better hand-function outcomes when TOT was added to traditional workouts in RA, were supported by the experimental group's considerably higher improvement in DHI scores (p=0.041). Similarly, the experimental group's HAQ-DI scores increased significantly greater (p=0.021), demonstrating that occupational therapy or exercise interventions can enhance functional capacity or quality of life in RA patients (Bovend'Eerdt et al., 2025; Stern et al., 2025).

Due to repeated meaningful task practice or exercise-induced analgesic effects, both groups showed significant reductions in VAS scores, with the experimental group showing a considerably higher improvement (p=0.047). The additional effect of TOT was more noticeable in functional outcomes than in isolated strength measures, indicating that task-specific practice may improve coordination or performance beyond strength improvements alone. Grip or pinch strength both significantly improved in both groups. According to Stern et al. (2025) [6]. these findings generally support the integration of task-oriented activities with resistive exercises or ROM therapy in RA rehabilitation, with a twice-weekly, five-week program offering a practical approach to improving hand function, lowering pain, or enhancing functional independence.

5. CONCLUSION

This randomized controlled trial showed that adding task-oriented training (TOT) to conventional rehabilitation, including resistive exercises or range-of-motion therapy, resulted produced more significant improvements in rheumatoid arthritis patients' pain, hand function, quality of life, grip strength, or pinch strength. The measured outcomes indicated significant improvements in both groups;

however, individuals receiving TOT outperformed those receiving traditional rehabilitation alone ($p < 0.05$).

The findings suggest that incorporating task-oriented activities into rehabilitation may enhance functional performance or independence in daily activities among people with rheumatoid arthritis.

6. DECLARATIONS & ETHICAL STATEMENTS: .

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Authors' Contributions: SS conceptualized the study, drafted the protocol, carried out data collection, or wrote the initial manuscript draft. RKS supervised the project or critically revised the manuscript. PR edited the manuscript or coordinated submission. All authors read or approved the final manuscript.

Ethical Approval or Consent: Approved IEC at Santosh College of Occupational Therapy, Ghaziabad **(Ref. No.- SCOT/JULY-25/EC-ORTHO-01).**Every participant in the trial gave their informed agreement to either participate in the intervention or have their data published.

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7. Conflict of Interest: Nil

8. References:

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