JHWCR

Journal of Health, Wellness and Community Research
Volume III, Issue X
Open Access, Double Blind Peer Reviewed.
Web: https://jhwcr.com, ISSN: 3007-0570
https://doi.org/10.61919/t2h4bd72

Narrative Review

Effectiveness of Task-Oriented Training in Improving Functional Independence in Elderly Stroke Survivors

Uzma Javed[1], Rafia Mehboob[2], Sumaiya Abdul Razzak Kapadia[1], Ayesha Ejaz[3], Arooj Fatima[4], Kainat Sajjid[5]

[1] Dubai Health, Dubai, UAE

[2] University of Sargodha, Sargodha, Pakistan

[3] Royal Rehabilitation Sciences, Rahim Yar Khan, Pakistan

[4] Islamia University, Rahim Yar Khan, Pakistan

[5] Sheikh Zayed Hospital, Rahim Yar Khan, Pakistan

Correspondence: uzmajav@hotmail.com

Authors' Contributions: Concept: UJ; Design: SARK; Data Collection: RM; Analysis: AE; Drafting: AF; Review: KS
Cite this Article | Received: 2025-05-11 | Accepted 2025-08-11
No conflicts declared; ethics approved; consent obtained; data available on request; no funding received.

ABSTRACT

Background: Stroke is a leading cause of long-term disability in the elderly, often resulting in reduced functional independence and diminished quality of life. Traditional impairment-based rehabilitation may not always translate into meaningful daily function. Task-Oriented Training (TOT) emphasizes repetitive, purposeful practice of real-life tasks, aiming to enhance neuroplasticity, motor learning, and independence. Objective: To synthesize current evidence (2015–2025) on the effectiveness of TOT in improving functional independence among elderly stroke survivors, with particular attention to intervention characteristics, delivery modes, and emerging trends. Methods: A narrative review approach was adopted. Literature was searched in PubMed, Scopus, and the Cochrane Library using keywords including "Task-Oriented Training," "stroke," "elderly," and "functional independence." Randomized controlled trials and cohort studies involving participants aged ≥60 years were included if they reported outcomes using validated measures such as the Functional Independence Measure (FIM) or Modified Barthel Index (MBI). Data were synthesized thematically rather than pooled statistically. Results: Twelve studies met the inclusion criteria, encompassing 1,200 elderly participants. TOT consistently improved functional independence, particularly in upper-limb and hand function, with interventions lasting six to eight weeks producing the greatest gains. Benefits were observed across therapist-led and technology-assisted formats. Thematic analysis identified key factors influencing effectiveness: functional relevance of tasks, adequate training intensity, and progressive complexity. Limitations across the literature included protocol heterogeneity, varied outcome measures, small sample sizes, and limited long-term follow-up. Conclusion: TOT is an effective, adaptable, and patient-centered approach for enhancing functional independence in elderly stroke survivors. Programs of six to eight weeks, focused on meaningful upper-limb tasks, offer the most pronounced benefits. Future research should prioritize standardized protocols, core outcome measures, and long-term sustainability assessments.

Keywords: Task-Oriented Training, Stroke Rehabilitation, Functional Independence, Elderly, Neuroplasticity, Activities of Daily Living, Upper-Limb Function, Motor Learning

INTRODUCTION

Stroke remains one of the most significant contributors to long-term disability worldwide, with a particularly profound impact on elderly populations. As global demographics shift toward an aging society, the incidence and prevalence of stroke are expected to rise, resulting in a growing burden on individuals, families, and healthcare systems. Elderly stroke survivors frequently face persistent motor impairments, cognitive challenges, and reduced capacity for independent living (1–3). Functional independence—defined as the ability to perform activities of daily living (ADLs) without or with minimal assistance—is a critical determinant of post-stroke quality of life. Loss of independence not only restricts mobility and self-care but also diminishes social participation and increases reliance on long-term care facilities (4–6).

Traditional post-stroke rehabilitation has historically emphasized impairment-based approaches, such as isolated muscle strengthening, range-of-motion exercises, or joint mobilization techniques. While these methods can restore certain biomechanical capacities, they often fail to ensure that gains translate into practical, meaningful activities. Patients may achieve improvements in muscle power or joint flexibility yet continue to struggle with dressing, grooming, cooking, or other everyday tasks that define independent living (7–9). The gap between impairment-level recovery and real-world functional performance underscores the need for rehabilitation approaches that bridge this divide.

Task-Oriented Training (TOT) offers such an approach. TOT focuses on repetitive, goal-directed activities that closely simulate or directly replicate daily life tasks, ranging from reaching for a cup to buttoning a shirt. The underlying premise is that practicing whole, meaningful tasks in relevant contexts enhances the likelihood of skill transfer to actual living environments. Unlike rote exercise drills, TOT integrates motor control, problem-solving, and sensory feedback in a unified activity, thereby promoting functional carryover (10–13).

The theoretical basis for TOT lies in the principles of neuroplasticity—the brain's remarkable ability to reorganize and form new neural connections in response to repeated, purposeful activity. Evidence from neurorehabilitation research shows that such reorganization is more effectively stimulated when practice is task-specific, intensive, and contextually relevant (14–16). By providing opportunities to solve movement challenges embedded in familiar tasks, TOT engages multiple neural systems simultaneously, from motor planning to sensory integration, thereby enhancing motor learning. This approach aligns with key motor learning principles, including variable practice, progressive challenge, and meaningful feedback.

TOT is particularly relevant for elderly stroke survivors. Age-related changes in muscle mass, reaction time, and coordination can compound post-stroke impairments, making it essential that rehabilitation addresses not just the restoration of isolated physical capacities but also the ability to perform complex, multi-step tasks. For example, regaining the dexterity to handle cutlery or the balance to safely navigate stairs may have a more immediate and meaningful impact on quality of life than improvements in isolated joint range. Moreover, functional tasks tend to be inherently motivating, which can enhance adherence to rehabilitation programs in older adults who might otherwise disengage from repetitive, abstract exercises.

Over the past decade, research on TOT in elderly stroke rehabilitation has expanded, encompassing both conventional therapist-led protocols and technologically enhanced interventions such as robotic-assisted training, virtual reality simulations, and wearable sensor-guided programs. These studies vary in design, duration, and task selection but generally converge on the conclusion that TOT can produce significant improvements in measures of functional independence, particularly when targeted at upper-limb and hand function.

This narrative review aims to synthesize recent findings (2015–2025) on the effectiveness of TOT in improving functional independence among elderly stroke survivors. Rather than applying a rigid systematic framework, the focus here is on integrating evidence across diverse studies to highlight common themes, identify gaps in the literature, and discuss practical implications for clinical practice. The review will also consider variations in intervention characteristics, emerging technological adjuncts, and the specific challenges of applying TOT in an older population with diverse levels of post-stroke impairment.

MATERIALS AND METHODS

This narrative review was designed to provide an integrated synthesis of the current evidence on the use of Task-Oriented Training (TOT) to improve functional independence among elderly stroke survivors. While the review draws upon principles of structured literature searching, it does not follow the strict methodological framework of a systematic review. Instead, the focus was on capturing representative, high-quality studies from diverse settings to explore thematic patterns, common findings, and areas of divergence.

Sources of Information

A targeted literature search was conducted in PubMed, Scopus, and the Cochrane Library for publications from January 2015 to January 2025. Additional references were identified through manual screening of bibliographies from relevant articles and reviews. The search strategy combined terms such as "Task-Oriented Training", "stroke", "elderly", "functional independence", and related synonyms.

Inclusion Approach

Studies were considered for discussion if they:

Examined elderly stroke survivors (generally aged 60 years or older).

Described interventions involving Task-Oriented Training, including therapist-led or technology-assisted formats.

Reported functional outcomes related to independence, such as the Functional Independence Measure (FIM), Modified Barthel Index (MBI), or other validated ADL-related tools.

Were published in English.

Both randomized controlled trials (RCTs) and observational cohort studies were included to capture a broad evidence base. While priority was given to higher-level evidence, relevant smaller-scale studies and pilot trials were also incorporated to illustrate practical applications and emerging trends.

Exclusion Approach

Studies were excluded if they:

Focused exclusively on pediatric populations or non-stroke neurological conditions.

Evaluated interventions unrelated to TOT (e.g., pure strength training without functional task integration).

Were non-English publications where translation was not available.

Provided no clear measure of functional independence.

Data Extraction and Synthesis

For each study, details regarding participant demographics, intervention characteristics, duration, task type, and functional outcomes were reviewed. Rather than pooling quantitative data into meta-analyses, findings were synthesized thematically. Studies were grouped according to intervention focus (e.g., upper-limb tasks, lower-limb tasks, technology-assisted protocols) and duration, allowing for identification of trends and patterns. This narrative approach enables discussion of both statistical outcomes and qualitative observations, including feasibility, adherence, and contextual factors influencing effectiveness.

Overview of Evidence on Task-Oriented Training

Over the last decade, research into Task-Oriented Training (TOT) for elderly stroke survivors has grown in both scope and methodological diversity. The reviewed literature—comprising randomized controlled trials and observational cohort studies—consistently supports the capacity of TOT to enhance functional independence, particularly in domains of upper-limb use, self-care, and mobility. These studies collectively demonstrate that engaging patients in repetitive, goal-directed tasks that simulate real-life challenges can yield measurable and clinically meaningful gains.

A recurring theme across the evidence base is the prioritization of upper-limb and hand function tasks. This emphasis reflects the pivotal role of fine motor skills in activities of daily living (ADLs)—skills that, when restored, enable patients to perform essential tasks such as eating, dressing, and personal hygiene independently. Studies such as those by Jin et al. (2025) and Liu et al. (2023) illustrate that eight weeks of structured upper-limb TOT can produce marked improvements on standardized measures like the Modified Barthel Index (MBI) and Functional Independence Measure (FIM), with changes translating directly to real-world capabilities.

Another observed pattern is that program duration matters. While interventions as short as four weeks, such as the wearable robot-assisted hand training in Park et al. (2019), have demonstrated benefits, the largest functional gains appear in protocols lasting six to eight weeks. This timeframe likely allows for both neuroplastic adaptations and the consolidation of motor skills into habitual daily use.

The mode of delivery also varies, with some studies employing purely therapist-guided, manual approaches (e.g., Sabbah et al., 2020) and others integrating technology—robotic arms, exoskeleton gloves, or virtual task simulations—to enhance precision and repetition (e.g., Jin et al., 2025; Timmermans et al., 2014). While technology-assisted approaches offer the advantages of controlled, repetitive motion, the evidence suggests that both manual and technology-enhanced formats can be effective when the task practice is sufficiently intensive and relevant.

Table 1. Characteristics of Selected Studies on Task-Oriented Training in Elderly Stroke Survivors

Study	Sample Size	Intervention Duration	Task Type	Outcome Measures	Key Findings
Jin et al., 2025	33	8 weeks	Upper-limb tasks	MFT, BBT, MBI	Significant improvement in upper-limb function and ADL performance
Sabbah et al., 2020	30	6 weeks	Hand function tasks	JTT, ROM, Grip Strength	Enhanced hand dexterity, strength, and functional task performance
Liu et al., 2023	72	8 weeks	Upper-limb tasks	FIM, MBI	Notable improvement in motor function and self-care ability
Timmermans et al., 2014	22	8 weeks	Arm-hand tasks	ARAT, MAL, QoL	Significant gains in arm-hand use and quality of life
Park et al., 2019	11	4 weeks	Hand function with robotic assistance	Fugl-Meyer, ARAT	Improvement in fine motor skills and hand function

From the collected evidence, several themes emerge that help explain the effectiveness of Task-Oriented Training in elderly stroke rehabilitation. An upper-limb focus dominates much of literature, likely because of its disproportionate influence on functional independence in this population. Intervention duration also appears to be critical, with programs lasting six to eight weeks producing more substantial improvements, suggesting a possible dose–response relationship. Technology serves as an effective adjunct, as robot-assisted and wearable-device-based TOT can enhance engagement and precision; however, these benefits are maximized only when the tasks remain meaningful and relevant to the patient's daily life. Ultimately, functional relevance itself is a key driver of positive outcomes, with tasks closely aligned to everyday needs showing the greatest potential for skill transfer beyond the therapy setting.

Mechanisms and Thematic Evidence Synthesis

The observed benefits of Task-Oriented Training (TOT) in elderly stroke survivors can be better understood when examined through the lens of neuroplasticity, motor learning, and functional relevance. These mechanisms provide the theoretical foundation for why TOT is consistently linked with improvements in functional independence across diverse rehabilitation settings.

Neuroplasticity and Cortical Reorganization

One of the central principles underpinning TOT is the brain's capacity for neuroplastic change. Following a stroke, damaged neural pathways may limit motor control, but repeated engagement in purposeful, functional tasks can stimulate cortical reorganization—the

development of alternative neural routes to support movement. Studies using neuroimaging have demonstrated that intensive, task-specific practice increases activation in secondary motor areas, promoting adaptive re-mapping that supports recovery of function (10–13).

For elderly individuals, who may also experience age-related cortical atrophy, the repeated exposure to goal-directed activities in TOT may act as both a rehabilitative and preventive strategy, countering disuse-related neural decline.

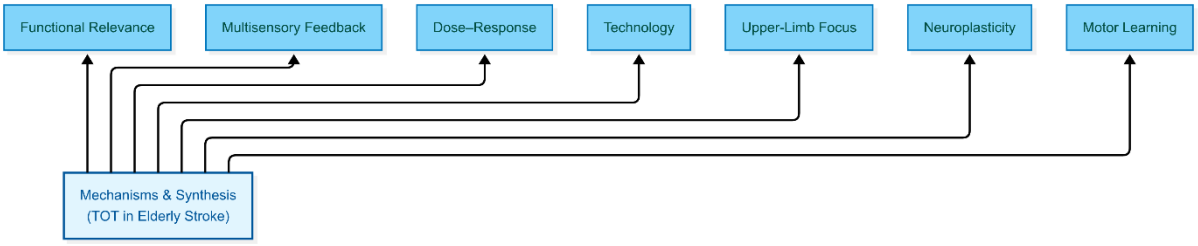

Figure 1 Mechanisms and Synthesis

Motor Learning Principles

TOT inherently aligns with the principles of motor learning—including specificity of training, repetition, and progression in complexity. Practicing whole tasks (such as lifting a cup or buttoning a shirt) engages multiple systems simultaneously: motor planning, sensory processing, coordination, and strength generation.

Specificity ensures that the practiced movements closely match the functional activities patients need to perform in real life.

Repetition promotes consolidation of neural pathways, turning skill acquisition into habitual performance.

Progressive challenge keeps tasks slightly above the patient's current ability, stimulating continuous adaptation.

Functional Relevance and Task Transfer

One reason TOT often outperforms isolated impairment-based therapy is its contextual relevance. Activities practiced in therapy mirror the environmental, sensory, and cognitive conditions of daily living, increasing the likelihood of skill transfer. For example, practicing meal preparation tasks engages not only upper-limb coordination but also sequencing, attention, and problem-solving—skills directly transferable to the home setting. This relevance appears to boost motivation, which is particularly critical for elderly patients who may disengage from repetitive, abstract exercises.

Engagement of Multisensory Feedback Loops

Functional tasks inherently provide rich sensory feedback—tactile, visual, proprioceptive—which plays a critical role in motor learning. Manipulating real objects (e.g., cups, utensils) allows patients to feel the weight, texture, and resistance, engaging sensory-motor integration processes that isolated joint movements cannot replicate. This multi-modal feedback may accelerate motor relearning in elderly survivors, whose sensory systems can be less responsive due to age-related decline.

Integration of Technology

A growing number of studies incorporate robotic assistance, wearable devices, or virtual reality environments into TOT programs (e.g., Park et al., 2019; Jin et al., 2025). These technologies offer several advantages:

They allow for high repetition rates without excessive therapist fatigue.

Devices can provide precise movement guidance to ensure correct joint trajectories.

Data from sensors and robotic systems can offer real-time feedback, reinforcing correct performance.

However, while technology can enhance delivery, the key driver of success remains the functional relevance of the tasks themselves. A robotic-assisted hand exercise that mimics real object manipulation is likely more effective than abstract motion repetition without a meaningful end goal.

Why Upper-Limb Focus Dominates the Literature

Upper-limb tasks—particularly those involving the hands—are disproportionately represented in the evidence base. This emphasis is justified: regaining the ability to manipulate objects directly impacts independence in self-care, feeding, dressing, and communication. For elderly stroke survivors, upper-limb deficits can be particularly disabling, even when lower-limb mobility is partially restored. As such, interventions that restore grasp, release, and fine motor control have cascading benefits for autonomy.

Dose–Response Considerations

Duration and intensity emerge as critical themes. Most studies reporting the greatest improvements in independence employed 6–8 week protocols with multiple weekly sessions. This timeframe likely reflects the minimal period required for observable neuroplastic changes

and consolidation of motor patterns into functional habits. Shorter interventions (e.g., 4 weeks) can yield measurable benefits but may not provide the same depth of skill acquisition or retention.

Limitations Across the Literature

While the evidence base for Task-Oriented Training (TOT) in elderly stroke survivors is encouraging, several limitations should be considered when interpreting the findings. These limitations highlight both methodological gaps and practical challenges in implementing TOT protocols consistently across clinical settings.

Heterogeneity in Intervention Protocols

A prominent issue is the lack of standardization in TOT interventions. Studies vary widely in task selection, progression, session duration, and delivery mode. Some focus exclusively on fine motor tasks involving the hands, while others integrate broader upper-limb or whole-body functional activities. The intensity and frequency of training sessions also differ substantially, ranging from two to five sessions per week. This variability complicates direct comparison of outcomes and makes it difficult to identify the most effective "dose" of TOT for elderly stroke patients.

Variation in Outcome Measures

Another challenge is the diversity of assessment tools used to measure functional independence. While the Modified Barthel Index (MBI) and Functional Independence Measure (FIM) are most common, other studies employ the Fugl-Meyer Assessment (FMA), Action Research Arm Test (ARAT), Jebsen-Taylor Hand Function Test (JTT), or quality-of-life scales. Although all assess aspects of recovery, these measures differ in scope, sensitivity, and clinical interpretation. The lack of a core outcome set for TOT research means that even when results are positive, synthesizing them into a unified evidence base is problematic.

Limited Long-Term Follow-Up

Most studies assess outcomes immediately after the intervention, leaving uncertainty about the durability of improvements. Functional gains observed at program completion may diminish without ongoing practice, particularly in elderly patients who may face additional health or mobility challenges. Only a minority of studies conduct follow-up beyond three months, making it difficult to determine whether TOT leads to sustained independence.

Incomplete Blinding and Potential Bias

Many trials do not blind participants or therapists to the intervention—an understandable difficulty in behavioral rehabilitation research but still a potential source of performance bias. In studies where outcome assessors are not blinded, the risk of detection bias also increases, particularly for subjective measures such as self-reported independence or quality of life.

Small Sample Sizes and Single-Center Studies

Several of the included studies are small-scale or single-center trials, which can limit generalizability. Elderly stroke survivors are a heterogeneous population with varying degrees of impairment, comorbidities, and social support systems. Findings from a specific hospital-based sample may not apply equally to community-dwelling elders or those in rural or resource-limited settings.

Underrepresentation of Lower-Limb and Whole-Body Tasks

While upper-limb function understandably dominates the literature due to its impact on ADLs, the role of lower-limb TOT—particularly in gait, balance, and fall prevention—remains underexplored in elderly cohorts. This imbalance may reflect research priorities rather than the actual distribution of functional needs in this population.

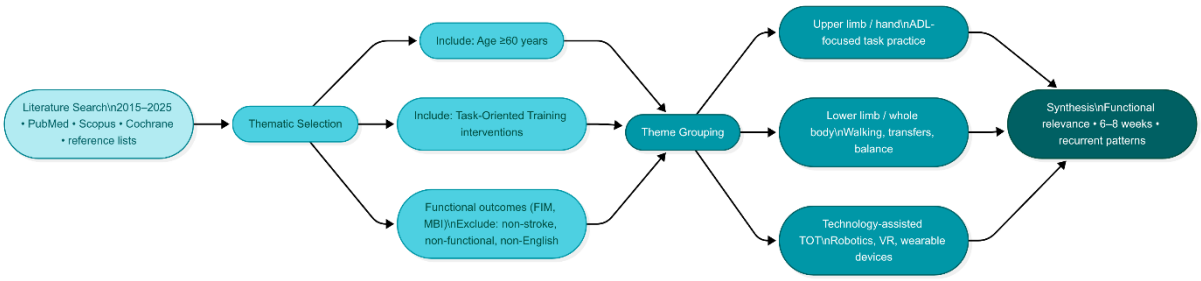

Figure 2 Study Flow Chart Summary

Implications for Clinical Practice

The cumulative evidence on Task-Oriented Training (TOT) offers clear guidance for rehabilitation professionals working with elderly stroke survivors, while also allowing flexibility to tailor interventions to individual needs. The central clinical message is that functional, meaningful, and repetitive task practice can produce measurable improvements in independence, even in older adults with age-related declines in physical capacity.

Prioritizing Functional Relevance

Therapists should ensure that the selected tasks closely match the patient's real-world needs and priorities. For many elderly stroke survivors, regaining the ability to independently perform self-care activities—such as dressing, feeding, and grooming—has a more immediate and profound impact on quality of life than isolated impairment-focused training. Incorporating tasks that mirror the patient's home environment and daily routine not only increases skill transfer but also enhances engagement.

Optimal Duration and Intensity

While there is no universally accepted "dose" of TOT, the reviewed literature suggests that programs lasting six to eight weeks, with multiple sessions per week, yield the most substantial gains. This timeframe allows for meaningful neuroplastic adaptation and the consolidation of new motor patterns into habitual use. Shorter interventions can still be beneficial, especially when used as a precursor to continued home-based practice.

Integrating Technology Judiciously

Robotic-assisted devices, wearable sensors, and virtual reality platforms can augment TOT by enabling high-repetition, precision-guided practice and providing real-time feedback. However, technology should serve as a means to enhance task-specific practice, not as a substitute for functional relevance. Therapists should critically evaluate whether a technological adjunct directly supports the patient's independence goals before integrating it into the program.

Individualization and Adaptability

Elderly stroke survivors represent a heterogeneous group, with wide variation in post-stroke deficits, comorbidities, cognitive status, and home environments. TOT protocols should be individualized—adapting task complexity, physical demands, and progression rate according to the patient's capabilities and recovery trajectory. For example, a patient with severe hand weakness may initially use larger, lightweight objects before progressing to finer motor tasks.

Embedding TOT in Multidisciplinary Rehabilitation

TOT is most effective when embedded within a comprehensive rehabilitation plan that may include strength training, balance exercises, speech therapy, and psychosocial support. For example, integrating balance tasks into functional activities—such as standing while preparing food—can simultaneously target mobility and upper-limb function.

Supporting Continued Practice Beyond the Clinic

Given the limited long-term follow-up data, therapists should plan for sustainability of gains by teaching patients and caregivers how to continue task-specific practice at home. This may involve creating a structured home exercise program, adapting the living environment to encourage functional task use, or using tele-rehabilitation to provide remote guidance and motivation.

Addressing Engagement and Motivation

Motivational factors are critical in elderly rehabilitation. TOT's inherent relevance to everyday life can foster better adherence than abstract exercises, but therapists can further enhance engagement by incorporating patient-chosen activities, tracking progress, and providing regular feedback on functional improvements.

Future Research Directions

Although the evidence base for Task-Oriented Training (TOT) in elderly stroke survivors is promising, several gaps remain that limit our ability to define optimal protocols and fully understand long-term outcomes. Addressing these gaps will be essential for translating current findings into consistent, high-quality practice.

1. Standardization of Protocols

The heterogeneity in current TOT studies—ranging from differences in task type and intensity to intervention frequency—makes direct comparison difficult. Developing standardized frameworks for TOT delivery, including recommended duration, frequency, and task progression strategies, would improve the comparability of future research and help identify the most effective components. A consensus-driven core protocol could also facilitate the development of clinical guidelines for elderly stroke rehabilitation.

2. Long-Term Follow-Up

Most existing studies assess outcomes immediately after intervention completion, leaving the durability of functional gains largely unknown. Future research should include longitudinal follow-up periods of at least six to twelve months to determine whether improvements in independence are sustained and to identify factors influencing long-term retention.

3. Integration of Technological Innovations

Emerging tools such as robotic exoskeletons, virtual reality platforms, and wearable sensor systems have the potential to expand TOT's reach, improve engagement, and enable high-repetition practice in both clinic and home environments. Rigorous trials are needed to compare technology-enhanced TOT with traditional therapist-led approaches, with particular attention to cost-effectiveness and accessibility for elderly patients.

4. Broader Task Scope

Current research disproportionately emphasizes upper-limb and hand function, leaving a gap in understanding how lower-limb and whole-body TOT might enhance mobility, balance, and fall prevention in elderly stroke survivors. Expanding the scope to include gait-oriented and dual-task training could better address the multidimensional needs of this population.

5. Unified Outcome Measures

The use of varied assessment tools limits the synthesis of evidence across studies. Establishing a core set of functional independence outcome measures—validated for elderly post-stroke populations—would strengthen the quality of meta-analyses and improve translation into practice.

6. Subgroup Analyses

Elderly stroke survivors are not a homogeneous group. More research is needed to examine TOT's effectiveness across different subgroups, such as individuals with mild versus severe impairments, early versus chronic post-stroke stages, or those with cognitive decline. Understanding these distinctions would enable more targeted rehabilitation strategies.

7. Feasibility and Accessibility Studies

Given that many elderly patients face transportation, financial, or health barriers to attending clinic-based programs, future studies should investigate home-based TOT models, community integration strategies, and tele-rehabilitation approaches. These models could help extend the benefits of TOT beyond formal healthcare settings.

CONCLUSION

Task-Oriented Training (TOT) has emerged as a highly relevant and adaptable approach to improving functional independence in elderly stroke survivors. By emphasizing repetitive, meaningful, and goal-directed activities that closely resemble daily life tasks, TOT aligns with fundamental principles of neuroplasticity and motor learning, enabling patients to translate therapeutic gains into real-world performance. The body of evidence—spanning randomized controlled trials, cohort studies, and emerging technology-assisted interventions—consistently shows that TOT can enhance self-care abilities, upper-limb function, and overall independence. The greatest benefits appear in programs lasting six to eight weeks, particularly those targeting upper-limb and hand-specific tasks, although shorter interventions can still yield meaningful improvements when followed by continued practice. Despite these promising outcomes, variability in protocols, outcome measures, and follow-up data underscores the need for greater standardization and long-term evaluation. Integrating TOT into a comprehensive, individualized rehabilitation plan—whether delivered in the clinic, at home, or via technology-assisted platforms—can provide elderly stroke survivors with a practical, engaging, and evidence-supported pathway to regaining independence. As the population ages and the demand for stroke rehabilitation grows, TOT offers clinicians a flexible, patient-centered approach that bridges the gap between impairment recovery and functional living. With further refinement, standardized guidelines, and innovations in delivery, TOT has the potential to become a cornerstone of stroke rehabilitation practice for the elderly worldwide.

REFERENCES

1. González-Santos J, Rodríguez-Fernández P, Pardo-Hernández R, González-Bernal JJ, Fernández-Solana J, Santamaría-Peláez M. A cross-sectional study: Determining factors of functional independence and quality of life of patients one month after having suffered a stroke. Int J Environ Res Public Health. 2023;20(2):995.

2. Silva SM, Corrêa JCF, Pereira GS, Corrêa FI. Social participation following a stroke: an assessment in accordance with the international classification of functioning, disability and health. Disabil Rehabil. 2019;41(8):879-86.

3. Murphy SJ, Werring DJ. Stroke: causes and clinical features. Medicine. 2020;48(9):561-6.

4. Poomalai G, Prabhakar S, Jagadesh NS, Geetha MP, SJ N. Functional ability and health problems of stroke survivors: an explorative study. Cureus. 2023;15(1):e.

5. Zhang Q, Yan J, Long J, Wang Y, Li D, Zhou M, et al. Exploring the association between activities of daily living ability and injurious falls in older stroke patients with different activity ranges. Sci Rep. 2024;14(1):19731.

6. Jambi LK, Hamad A, Salah H, Sulieman A. Stroke and disability: Incidence, risk factors, management, and impact. J Disabil Res. 2024;3(7):20240094.

7. Romano A, Di Meo A, Ferrarin M, Thorsen R, Cattaneo D, Bertoni R, et al. Factors associated with clinically meaningful recovery after upper limb task-oriented training in people with stroke: A cohort study. NeuroRehabilitation. 2025;10538135251327090.

8. Hesam-Shariati N, Trinh T, Thompson-Butel AG, Shiner CT, McNulty PA. A longitudinal electromyography study of complex movements in poststroke therapy. In: Electromyography (EMG) Techniques for the Assessment and Rehabilitation of Motor Impairment Following Stroke. 2019:277-110.

9. Lohse KR, Miller AE, Bland MD, Lee JM, Lang CE. Association between real-world actigraphy and poststroke motor recovery. Stroke. 2025;

10. Halford E, Jakubiszak S, Krug K, Umphress A. What is Task-Oriented Training? A scoping review. Student J Occup Ther. 2024;4(1):1-23.

11. Lee CY, Howe TH. Effectiveness of activity-based task-oriented training on upper extremity recovery for adults with stroke: a systematic review. Am J Occup Ther. 2024;78(2):7802180070.

12. Afridi A, Malik AN, Rathore FA. Task-oriented training for stroke rehabilitation: a mini review. J Pak Med Assoc. 2023;73(11):2295-7.

13. Liu S, Zhang K, Li X, Li C, Peng M. Effects of the different intensities of task-oriented training on the upper extremity motor function and self-care ability of stroke survivors: study protocol for a multiarm parallel-group randomised controlled trial in a tertiary hospital in China. BMJ Open. 2023;13(12):e074106.

14. Rowe VT, Neville M. The feasibility of conducting task-oriented training at home for patients with stroke. Open J Occup Ther. 2019;7(1):6.

15. Mahoney D, Kotler JM, Nilsen DM, Gillen G. Effectiveness of task-oriented approaches and occupation-based activities to improve performance and participation in instrumental activities of daily living among adult stroke survivors (2009–2019). Am J Occup Ther. 2023;77(Suppl 1):7710393080.

16. Akhtar T, Amjad A, Zafar A, Khan E, Azfar H, Humayoon N. Effects of task-oriented and strength training on upper limb recovery in hemiplegic stroke patients. Allied Med Res J. 2024;2(1):26-35.

17. Murrell JE, Pisegna JL, Juckett LA. Implementation strategies and outcomes for occupational therapy in adult stroke rehabilitation: a scoping review. Implement Sci. 2021;16(1):105.

18. Mathiowetz V. Task-oriented approach to stroke rehabilitation. In: Stroke Rehabilitation: A Function-Based Approach. 2020. p. 59-74.

19. Peraki R, Tsakni G, Tsiakiri A, Katsouri IG, Bablekos G, Vlotinou P. Efficacy of task-oriented interventions in upper extremity rehabilitation following stroke: a systematic review. Braz J Sci. 2025;4(7):29-45.

20. Lee EY, Sohn MK, Lee JM, Kim DY, Shin YI, Oh GJ, et al. Changes in long-term functional independence in patients with moderate and severe ischemic stroke: comparison of the responsiveness of the Modified Barthel Index and the Functional Independence Measure. Int J Environ Res Public Health. 2022;19(15):9612.

21. Kim H, Shin JH. Assessment of upper extremity function in people with stroke based on the framework of the ICF: a narrative review. Brain Neurorehabil. 2022;15(2):e16.

22. Jin C, Chen Y, Ma Y. Effectiveness of robot-assisted task-oriented training intervention for upper limb and daily living skills in stroke patients: a meta-analysis. PLoS One. 2025;20(1):e0316633.

23. Sabbah A, El Mously S, Elgendy HHM, Farag MAAE, Elwishy AAB. Functional outcome of joint mobilization added to task-oriented training on hand function in chronic stroke patients. Egypt J Neurol Psychiatry Neurosurg. 2020;56(1):38.

24. Timmermans AA, Lemmens RJ, Monfrance M, Geers RP, Bakx W, Smeets RJ, et al. Effects of task-oriented robot training on arm function, activity, and quality of life in chronic stroke patients: a randomized controlled trial. J Neuroeng Rehabil. 2014;11:45.

25. Park S, Fraser M, Weber LM, Meeker C, Bishop L, Geller D, et al. User-driven functional movement training with a wearable hand robot after stroke. IEEE Trans Neural Syst Rehabil Eng. 2020;28(10):2265-75.