Occupational Therapy Practice Guidelines for Adults With Stroke

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Importance: Stroke is a leading cause of disability. Occupational therapy practitioners ensure maximum participation and performance in valued occupations for stroke survivors and their caregivers.

Objective: These Practice Guidelines are meant to support occupational therapy practitioners' clinical decision making when working with people after stroke and their caregivers.

Method: Clinical recommendations were reviewed from three systematic review questions on interventions to improve performance and participation in daily activities and occupations and from one question on maintaining the caregiving role for caregivers of people after stroke.

Results: The systematic reviews included 168 studies, 24 Level 1a, 90 Level 1b, and 54 Level 2b. These studies were used as the basis for the clinical recommendations in these Practice Guidelines and have strong or moderate supporting evidence.

Conclusions and Recommendations: Interventions with strong strength of evidence for improving performance in activities of daily living and functional mobility include mirror therapy, task-oriented training, mental imagery, balance training, self-management strategies, and a multidisciplinary three-stages-of-care rehabilitation program. Constraint-induced therapy has strong strength of evidence for improving performance of instrumental activities of daily living. Moderate strength of evidence supported cognitive–behavioral therapy (CBT) to address balance self-efficacy, long-term group intervention to improve mobility in the community, and a wearable upper extremity sensory device paired with training games in inpatient rehabilitation to improve social participation. Practitioners should incorporate problem-solving therapy in combination with CBT or with education and a family support organizer program.

What This Article Adds: These Practice Guidelines provide a summary of strong and moderate evidence for effective interventions for people with stroke and for their caregivers.

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A *stroke,* also known as a *cerebrovascular accident* (CVA) or a *brain attack,* occurs when the brain is deprived of oxygen as a result of blockage (ischemic) or rupture of blood vessels (hemorrhagic) within or leading to the brain. In the United States, it is a leading cause of long-term disability or death (Centers for Disease Control and Prevention [CDC], 2022b). The yearly incidence of stroke is approximately 795,000, of which 77% are new strokes and 23% are recurrent strokes. In 2018, the prevalence of stroke, or the number of adults older than age 20 yr who had a stroke, was estimated to be 2.7%, or 7.6 million Americans, and it is projected to increase to 3.9% of the U.S. population by 2030. Globally, the prevalence of stroke in 2020 was 89.13 million, and the incidence of stroke per year was 11.71 million (Tsao et al., 2022).

Certain factors and health conditions can increase the risk of stroke: hypertension; smoking; diabetes; diet; physical inactivity; obesity; hyperlipidemia; heart disease; sickle cell disease flare-ups; kidney and liver disease; sleep disorders; and psychosocial factors, such as depression, psychological distress, and loneliness. These risks may be mitigated with health management strategies (American Occupational Therapy Association [AOTA], 2020; American Stroke Association [ASA], 2021; Tsao et al., 2022). However, nonmodifiable factors also increase the risk of stroke, such as age; family history; race; gender; and prior occurrence of a stroke, transient ischemic attack, or myocardial infarction (ASA, 2021). A stroke may occur at any age—one in seven strokes occurs in people ages 15 to 49 yr—but the chance of having a stroke doubles every 10 yr after age 55 (CDC, 2022c). Regarding race and

ethnicity, statistics show that Black, Hispanic, and Indigenous Americans have a higher incidence of stroke than non-Hispanic White or Asian Americans. In the United States, females have 55,000 more strokes each year and an overall higher lifetime risk of stroke than males. The intersectionality of age, gender, and race increases the risk of stroke among Black and Hispanic women older than age 70 compared with White women (Tsao et al., 2022). In addition, it must be noted that socioeconomic status and racial disparities often play a significant role in stroke outcomes. Socioeconomically deprived populations are less likely to receive effective management of stroke risk factors and equity in and access to good quality poststroke care (Marshall et al., 2015). Ikeme et al. (2022) found that a greater proportion of White patients than of racial minorities used emergency medical services, arrived within 3 hr from the onset of stroke symptoms, and received tissue-type plasminogen activator (tPA) or mechanical thrombectomy, thus negatively affecting stroke outcomes for Black, Hispanic, Asian, and Native American patients.

Other aspects of one's environment may also create a greater risk of having a stroke and of having poorer stroke outcomes. For example, people in rural areas of the United States experience poorer outcomes poststroke than those in urban areas. This has been hypothesized to be a result of the lack of equal access to evidence-based acute stroke care (Hammond et al., 2020). In addition, exposure to environmental degradation such as air pollution increases stroke risk worldwide (Tsao et al., 2022).

Diagnosis of acute stroke is based on the patient's history, clinical presentation, identifying signs and symptoms of stroke, a physical examination of stroke severity with the commonly used NIH Stroke Scale (National Institute of Neurological Disorders and Stroke, 2011), and cerebrovascular imaging (Choi et al., 2022; Powers et al., 2019). Diagnosing the type and location of the stroke is essential to ensure the best medical intervention and client outcomes. For instance, a person with an acute ischemic stroke may require tPA to remove blockage and decrease brain damage (Powers et al., 2019), and one with an acute hemorrhagic stroke may require medication or surgery to control bleeding (Unnithan et al., 2022).

The effects of a stroke vary greatly and depend on the location, severity, and type of stroke. In the cerebrum, left hemisphere strokes are thought to be more common than right hemisphere strokes (Portegies et al., 2015). Left hemisphere strokes may result in right-sided hemiplegia or hemiparesis, contralateral sensory impairments, apraxia, and communication difficulties, such as aphasia, and right hemisphere strokes may result in left-sided hemiplegia or hemiparesis, contralateral sensory impairments, unilateral spatial or body neglect, and spatial dysfunction (Johns Hopkins Medicine, 2022). A stroke in either hemisphere may cause dysphagia, cognitive impairments, depression, and visual deficits. Cerebellar strokes may result in ataxia, ataxic dysarthria, and poor postural control. Strokes in the brainstem may cause coma, dysphagia, diplopia, vertigo, or quadriparesis (Johns Hopkins Medicine, 2022).

In 2017, the caregiving that family and friends provided to all adults in need of assistance with daily activities in the United States was valued at about $470 billion per year (Reinhard et al., 2019). Stroke is one of the conditions that most often require caregiving. The ASA emphasizes the vital role that informal caregivers play as members of the stroke rehabilitation team (Collinson & De La Torre, 2017; Winstein et al., 2016). Moreover, the *Occupational Therapy Practice Framework: Domain and Practice* (4th ed.; *OTPF–4*; AOTA, 2020) states that caregiving is a co-occupation and that considering caregivers as clients is essential. Informal caregivers may assist with activities of daily living (ADLs), instrumental activities of daily living (IADLs), and medical tasks, such as administering medication and supervising home exercise programs (Reinhard et al., 2019). The effects of caregiving on the caregiver can be positive or negative. Positive effects include feeling good about oneself and becoming closer to the person who has had a stroke. However, caregiving's negative effects are most often reported and include harm to employment, finances, and mental health (depression, anxiety, stress, and burden or strain), as well as physical health challenges (injury or cardiovascular changes; Collinson & De La Torre, 2017; Loh et al., 2017; Schulz & Eden, 2016). When the caregiver experiences negative effects, the person who has had a stroke has a poorer outcome (Bakas et al., 2014).

Across the continuum of care, stroke patients and caregivers require a sustained and coordinated effort from a multidisciplinary rehabilitation team, of which occupational therapy is a vital part (Winstein et al., 2016). In stroke rehabilitation, occupational therapy practitioners implement the process that supports engagement and participation in occupations and health for both the adult with stroke and their caregiver (AOTA, 2020). Because the effects of a stroke are highly variable, assessment and intervention are client centered and based on holistic occupational therapy models of practice (e.g., the Person–Environment–Occupation model; Law et al., 1996).

Multiple frames of reference grounded in these holistic models guide stroke intervention. The biomechanical frame of reference is used to remediate limitations in range of motion, strength, and endurance caused by stroke (Grice, 2021). For impaired motor function, a motor control and motor learning frame of reference focused on task-oriented interventions improves motor performance and function (Nilsen & Gillen, 2021). Alternatively, for residual impairments after stroke that may be considered chronic or permanent, the occupational therapy practitioner focuses on compensatory or adaptive techniques, using the rehabilitation frame of reference (Winstead, 2021).

In all poststroke care settings, occupational therapy treatment of the person with stroke or the caregiver includes any or all of the intervention approaches enumerated in the *OTPF–4:* remediation, maintenance, compensation, prevention, and health promotion (AOTA, 2020). Stroke is not only an acute event but is also classified by the CDC (2022a) as a chronic disease if the impairments caused by the stroke limit ADLs or require medical attention for more than 1 yr. Thus, the occupational therapy stroke intervention changes from a focus on remediation to one on compensation, health promotion, and prevention to reduce modifiable stroke risk factors.

These practice guidelines update the previous *Occupational Therapy Practice Guidelines for Adults With Stroke* (Wolf & Nilsen, 2015) that were based on three systematic reviews addressing interventions within the scope of practice of occupational therapy to improve cognition, motor, and psychological and emotional impairments and one systematic review that examined the evidence for activity- and occupation-based interventions to improve occupation and social participation after stroke. In keeping with the philosophy of occupational therapy and the *International Classification of Functioning, Disability, and Health for Children and Youth* (World Health Organization, 2007) and the evolution of the literature since the last practice guidelines, the primary focus of these guidelines has shifted from impairment to occupational performance and participation. Therefore, the focus here is solely on ADLs, IADLs, and participation outcome measures, not impairment outcome measures (e.g., Modified Ashworth Scale [Bohannon & Smith, 1987], Fugl-Meyer Assessment [Fugl-Meyer et al., 1975; Gladstone et al., 2002]) or upper limb function (e.g., Action Research Arm Test [Lyle, 1981], Wolf Motor Function Test [Wolf et al., 2005]). These practice guidelines incorporate information from three systematic review questions on improving stroke survivors' occupational performance and participation in ADLs (Geller, Goldberg, et al., 2023a, 2023b; Geller, Winterbottom, et al., 2023; Goldberg et al., 2023a, 2023b; Winterbottom, Geller, et al., 2023; Winterbottom, Goldberg, et al., 2023); IADLs (Kotler et al., 2023; Mahoney et al., 2023); and education, work, volunteering, leisure, and social participation (Proffitt et al., 2022). In addition, the practice guidelines include findings from one systematic review question on interventions for caregivers that facilitate maintaining their caregiving role (Mack & Hildebrand, 2023), a category that was not in the previous practice guidelines for adults with stroke.

Systematic Review Questions

These Practice Guidelines are based on the following four questions:

1. What is the evidence for the effectiveness of interventions within the scope of occupational therapy practice to improve performance and participation in ADLs for adult stroke survivors?
2. What is the evidence for the effectiveness of interventions within the scope of occupational therapy practice to improve performance and participation in IADLs among adult stroke survivors?
3. What is the evidence for the effectiveness of interventions within the scope of occupational therapy practice to improve the performance of and participation in education, volunteering, social participation, work, and leisure among adults poststroke?
4. What is the evidence for the effectiveness of interventions within the scope of occupational therapy practice for caregivers of people with stroke to facilitate maintaining participation in the caregiver role?

Goals of These Practice Guidelines

Through these Practice Guidelines, AOTA aims to help occupational therapy practitioners, as well as the people who manage, reimburse, or set policy regarding occupational therapy services, understand occupational therapy's contribution in providing services to people with stroke and their care partners. These guidelines can also serve as a reference for health care professionals, health care facility managers, education professionals, education and health care regulators, third-party payers, managed care organizations, and those who conduct research to advance the care of people with stroke.

These Practice Guidelines were commissioned, edited, and endorsed by AOTA without external funding being sought or obtained. They were financially supported entirely by AOTA and developed without any involvement of industry. All authors of the systematic reviews completed conflict-of-interest disclosure forms, with no conflicts noted. AOTA reviews practice guidelines, and updates them as needed, every 5 yr to keep the recommendations on each topic current according to criteria established by ECRI (2020). Guidelines topics are evaluated by a multidisciplinary advisory group consisting of AOTA members, nonmember content experts, and external stakeholders. These Practice Guidelines were reviewed and revised on the basis of feedback from a group of content experts on people with stroke that included practitioners, researchers, educators, practitioners, and policy experts. Reviewers who agreed to be identified are listed in the Acknowledgments.

These Practice Guidelines report the findings from systematic reviews of published scientific research on focused topic-specific questions. The systematic reviews were conducted according to the Cochrane Collaboration methodology (Higgins et al., 2019) and are reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for conducting systematic reviews (Moher et al., 2009). The process included

- protocol and question development with input from a multidisciplinary advisory group that also included consumers and information end users,
- a literature search conducted by a medical research librarian, and
- team evaluation of literature and a synthesis of findings (see Appendix Table A.2).

Interventions that were described in sources other than the published literature and that did not meet the inclusion criteria were excluded from the reviews.

Occupational therapy practitioners should not consider these Practice Guidelines to be a source of comprehensive information about stroke or about application of the occupational therapy process. The occupational therapy practitioner makes the ultimate clinical judgment regarding the appropriateness of a given intervention in light of a specific client's or group's circumstances, needs, and response to intervention, as well as the evidence available to support the intervention. Examples of how evidence can inform practice with people with stroke are included in the "Case Studies and Evigraphs" section.

AOTA supported the systematic reviews on the effectiveness of interventions within the scope of occupational therapy for people with stroke as part of its Evidence-Based Practice (EBP) Program. AOTA's EBP Program is based on the principle that the evidence-based practice of occupational therapy relies on the integration of information from three sources: (1) clinical experience and reasoning, (2) preferences of clients and their families, and (3) findings from the best available research. The systematic reviews and these Practice Guidelines report the findings from the best available research published since the previous Practice Guidelines. For updated Question 1, that research was published from 2012 through 2019; for Questions 2 to 3, from 2009 through 2019; and for new Question 4, from 1999 through 2019.

Clinical Recommendations for Occupational Therapy Interventions for Adults With Stroke

Clinical recommendations are the final phase of the synthesis of systematic review findings. The findings for each systematic review question are graded in terms of how confident a practitioner can feel that using the interventions presented in the evidence will improve the outcomes of interest to their clients. The grade is based on the specificity of the intervention, number of studies supporting the intervention, level of evidence of the studies, quality of the studies, and significance of the study findings. Interventions included in the clinical recommendations are specific to a population, and the articles that describe them provide sufficient detail for practitioners to understand the intervention and the outcomes of interest.

Describing the strength of clinical recommendations is an important part of communicating an intervention's efficacy to practitioners and other users. The recommendations for these Practice Guidelines were evaluated and finalized by AOTA staff, the AOTA research methodologist, and the systematic review and Practice Guidelines authors. AOTA uses the grading methodology provided by the U.S. Preventive Services Task Force (2018) for clinical recommendations. The clinical recommendations pertaining to each review, along with the studies' level of evidence and supporting details, are presented in Tables 1 to 4.

For the purposes of these Practice Guidelines, we report only recommendations graded A, B, and D, the grades that best support clinical decision making:

- A: There is *strong evidence* that occupational therapy practitioners should routinely provide the intervention to eligible clients. Strong evidence was found that the intervention improves important outcomes and that benefits substantially outweigh harms.
- B: There is *moderate evidence* that occupational therapy practitioners should routinely provide the intervention to eligible clients. There is high certainty that the net benefit is moderate, or there is moderate certainty that the net benefit is moderate to substantial.
- D: It is recommended that occupational therapy practitioners *not* provide the intervention to eligible clients. At least fair evidence was found that the intervention is ineffective or that harms outweigh benefits. In these reviews, we did not find Grade D evidence.

These grades are reported in Tables 1 to 4 and designated with green, indicating *should consider if appropriate* (A), or yellow, indicating *could consider if appropriate* (B).

The complete findings for the four systematic review questions can be found in the systematic review articles (Proffitt et al., 2022; Mack & Hildebrand, 2023) and the Systematic Review Briefs (Geller, Goldberg, et al., 2023a, 2023b; Geller, Winterbottom, et al., 2023; Goldberg et al., 2023a, 2023b; Kotler et al., 2023; Mahoney et al., 2023; Winterbottom, Geller, et al., 2023; Winterbottom, Goldberg et al., 2023) on this topic published in the *American Journal of Occupational Therapy*. As always, practitioners' clinical decisions should be informed by the evidence presented in these Practice Guidelines, in combination with their clinical experience and the client's particular goals.

Translating Clinical Recommendations Into Practice

Clinical Reasoning Considerations

Very rarely will practitioners find an evidence-based intervention that perfectly fits their clinical setting and the client's specific needs. Occupational therapy practitioners need to consider several questions as they evaluate the research and consider whether they can use an intervention, or adapt it, in a well-reasoned way, to exactly meet the client's needs (Highfield et al., 2015):

Table 1. Clinical Recommendations for Interventions to Improve ADL and FM Outcomes

Grade/Evidence Level	Citation	Intervention Details
MT and TOT for ADLs and FM		
A: Strong	*Recommendation:* Practitioners should consider providing MT in conjunction with TOT to improve FM and ADL performance during inpatient rehabilitation or home-based services for adults at all stages of stroke recovery (dose: 15–45 min, 2–6×/wk, for 2–6 wk)	
1a Meta-analysis Canada	Louie et al. (2019)	*Participants:* $N = 633$ adults at acute, subacute, and chronic stage of stroke *Setting:* Inpatient rehabilitation *Intervention:* MT of the affected lower limb in seated, semisitting, or long sitting with mirror between legs. The intervention was TOT MT combined with standard inpatient rehabilitation. *Delivery method:* Individual *Dose:* 15–40 min, 3–6 days/wk, for 2–12 wk *Improvement:* In 5 studies ($N = 158$), participants in the intervention group showed significant improvements in FM compared with the control group (small effect size). Two studies ($N = 63$) found that the intervention group had statistically significant improvements in FM compared with the control group.
1a Meta-analysis China	Yang et al. (2018)	*Participants:* $N = 1{,}685$ people with stroke (recovery time not noted) *Setting:* Rehabilitation (specific site not reported) *Intervention:* 37 trials of MT of the affected upper limb alone or combined with e-stimulation versus control group *Delivery method:* Individual *Dose:* Varied, not reported *Improvement:* 20 studies ($N = 934$; 2 studies used MT + e-stim) found significant improvements in ADLs in the intervention group compared with the control group (moderate to large effect size).
1b RCT Taiwan	Hsieh et al. (2018)	*Participants:* $N = 12$ adults with subacute and chronic stroke *Setting:* Home based *Intervention:* MT followed by home-based versus hospital functional task training (grooming, meal preparation, bathroom transfer) *Delivery method:* Individual *Dose:* 30–45 min MT followed by 45–60 min functional training 2×/wk for a total of 12 training sessions *Improvement:* A statistically significant improvement (sit to stand) was seen in FM in favor of home-based MT versus clinic-based MT.
MI and TOT for FM		
A: Strong	*Recommendation:* Practitioners should consider the use of MI, using video, audio, or images of specific movements or tasks, as an adjunct to TOT for adults with stroke at all stages of recovery to improve FM in the short term (dose: <6 wk; 12–40 5- to 30-min sessions over 4–6 wk).	
1a Meta-analysis Brazil	Guerra et al. (2017)	*Population:* $N = 995$ adults with acute, subacute, and chronic stroke (majority, acute or subacute) *Setting:* Not reported

(*Continued*)

Table 1. Clinical Recommendations for Interventions to Improve ADL and FM Outcomes (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
		Intervention: 32 trials of MI of specific movements or tasks, including audiotapes, films, or images related to the movement plus routine treatment *Delivery method:* Individual *Dose:* The number of sessions ranged from 12 to 40, with the most common being 12. Duration ranged from 5 to 30 min per session for either 4 or 6 wk. *Improvement:* 4 studies ($N = 116$) found significant improvements in FM in the intervention group compared with the control group (large effect size).
1a Meta-analysis China	Li et al. (2017)	*Population:* $N = 735$ adults with acute, subacute, or chronic stroke *Setting:* Hospital, rehabilitation center, and nursing home (majority hospital) *Intervention:* MI (videotape or audiotape) plus routine treatment or training *Delivery method:* Individual *Dose:* 5–30 min (most common 15 min) for 2–8 wk (most common 6 wk) *Improvement:* 2 studies ($N = 54$) found that short-term FM interventions <6 wk resulted in significant improvements in FM in the intervention group compared with the control group (large effect size).
Balance Training for ADLs and FM		
A: Strong	*Recommendation:* Practitioners should consider providing balance training to improve ADLs (inpatient rehabilitation setting) and FM (inpatient rehabilitation and other settings) for adults with subacute and chronic stroke (dose: 2–62 hr; e.g., 1 hr conventional therapy with 15-min balance intervention, 5×/wk for 5 wk)	
1a Meta-analysis Netherlands	van Duijnhoven et al. (2016)	*Population:* $N = 430$ adults with chronic stroke *Setting:* Not reported *Intervention:* 43 trials (36 trials for meta-analysis) of balance, functional weight shifting training, or both; gait training; multisensory training; high-intensity aerobic training; other training *Delivery method:* Not reported *Dose:* 1.9–61.7 hr (details not reported) *Improvement:* A significant improvement was found in FM in 28 trials ($N = 985$).
1b RCT Spain	Cabanas-Valdés et al. (2016, 2017 [3-mo follow-up])	*Participants:* $N = 80$ adults with subacute stroke; follow-up, $N = 79$ *Setting:* Inpatient rehabilitation *Intervention:* Core stability exercises 15 min/day plus conventional therapy (PT facilitation, stretching, passive mobilization, ROM, walking, OT, and nursing) *Delivery method:* Individual *Dose:* Conventional therapy for 1 hr, 5 days/wk, for 5 wk (25 sessions) plus an additional 15 min of core stability exercises per session (total of 31 hr) *Improvement:* Significant improvement was seen in ADLs and FM. FM was still significantly improved after 3 mo.

(*Continued*)

Table 1. Clinical Recommendations for Interventions to Improve ADL and FM Outcomes (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
Three-Stage Multidisciplinary Rehabilitation Program for ADLs and FM		
A: Strong	*Recommendation:* Practitioners should consider providing 3 stages of care—from hospital, to inpatient rehabilitation, to home or community—for people poststroke across the continuum from onset through 6 mo (dose Stage 1, 45 min/day, 5× wk, for 1 mo; Stage 2, 45 min/day, 5×/wk, Months 2 and 3; Stage 3, 45 min/day, 5×/wk, Months 4–6)	
1b RCT China	Bai et al. (2012)	*Population: N* = 364 adults with hemiplegia after acute ICH in an inpatient emergency or neurology unit *Setting:* Inpatient hospital (Stage 1), rehabilitation center (Stage 2), and home based (Stage 3) *Intervention:* Early rehabilitation group received routine internal medical intervention + 3-stage rehabilitation program (PT and OT with emphasis on ADL training). Stage 1 focused on basic ADLs for 1st mo poststroke; Stage 2 focused on balance and walking 2–3 mo poststroke; and Stage 3 focused on ADLs and motor function 4–6 mo poststroke. Control group received routine internal medicine intervention only and no rehabilitation intervention. *Delivery method:* Individual, in person *Dose:* Stage 1, 45 min/day, 5× wk, for 1 mo; unspecified for Stages 2 (2 and 3 mo postonset) and 3 (4-, 5-, and 6-mo postonset). *Improvement:* ADL performance improved.
1b RCT China	Bai et al. (2014)	*Population: N* = 165 adults (age range = 40–80 yr) stabilized for 1 wk after 1st stroke in inpatient hospital *Setting:* Inpatient hospital (Stage 1), rehabilitation center (Stage 2), home based (Stage 3) *Intervention:* Received standard care in hospital + 3-stage rehabilitation protocol. Stage 1 (1st mo poststroke in inpatient hospital) included passive movement, positioning of limbs, active movement, sitting, standing, balance training. Stage 2 (2–3 mo poststroke in rehabilitation center) included PROM, strengthening, walking and balance training, stairs, and active exercise related to ADLs for the upper limbs. Stage 3 (4–6 mo poststroke home-based rehab) included ADL training supervised by caregivers with therapy every 2 wk in the home. *Delivery method:* Individual, in person *Dose:* Stage 1, 45 min/day, 5 days/wk (1st mo poststroke); Stage 2, 45 min 2×/day, 5 days/wk (2–3 mo poststroke); Stage 3, every 2 wk *Improvement:* ADL performance improved.
Stroke Self-Management Interventions for ADLs		
A: Strong	*Recommendation:* Practitioners should consider providing a health management intervention for stroke self-management, using a mixture of group, individual, and telephone follow-up, to improve ADL performance of adults poststroke, during inpatient or outpatient rehabilitation (dose: 20- to 60-min sessions, 1–5×/wk, with telephone follow-up for 6–13 wk)	
1b RCT China	Sit et al. (2016)	*Population: N* = 210 adults with first-time stroke scheduled for ambulatory stroke rehabilitation *Setting:* Outpatient rehabilitation *Intervention:* Usual care + HEISS included self-management skills, self-efficacy activities, and goal setting and action planning with workbook. Part 1 included 6 weekly small groups from Wk 3 to Wk 8 for self-efficacy and

(*Continued*)

Table 1. Clinical Recommendations for Interventions to Improve ADL and FM Outcomes (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
		self-management skills. Part 2 involved home-based biweekly telephone calls from Wk 9 to Wk 13 to encourage positive change and help with problem-solving skills. Control group received usual-care ambulatory stroke rehabilitation. *Delivery method:* Group and telephone follow-up *Dose:* 6 weekly 1-hr small groups (Wk 3–8), biweekly phone calls (Wk 9–13) *Improvement:* Significant improvement in basic ADL outcomes in intervention group compared with control group at 1 wk, 3 mo, and 6 mo postintervention.
1b RCT China	Chen et al. (2018)	*Population:* $N = 144$ adults with acute stroke in an inpatient rehabilitation setting *Setting:* Inpatient rehabilitation *Intervention:* Usual care + PCSMEI: 5 daily sessions (self-management knowledge and skills; self-management goals; information on individuated health needs, such as stroke risk factors; self-health monitoring; advice; problem solving), small-group session (talk with each other regarding stroke management), and 4 weekly telephone follow-ups postdischarge (assess patients' self-management skills and behaviors). Control group received usual care. *Delivery method:* Individual and group, with telephone follow-up postdischarge *Dose:* Five 20-min daily sessions in 1st wk, 1 60-min small-group session in 2nd wk, 1 discharge session, 4 20- to 30-min weekly telephone follow-ups *Improvement:* Intervention group had significant improvement in basic ADL outcomes at 3 mo postintervention compared with the control group.
CBT Intervention for ADLs		
B: Moderate	*Recommendation:* Practitioners could consider providing group or individual CBT, inpatient or in the community, for adults with depression poststroke to improve ADL performance (dose: 3–40 wk total, 3–40 sessions total)	
1a Meta-analysis China and Australia	Wang et al. (2018)	*Population:* Adults with poststroke depression. 23 RCTs ($N = 1{,}972$) were included in the systematic review ($N = 753$ participants from 7 meta-analyses of ADL outcomes) *Setting:* Not reported *Intervention:* CBT alone or CBT with antidepressants. Control group received placebo or same antidepressants as CBT group. *Delivery method:* Group and individual treatment with community and inpatient participants *Dose:* Treatment duration ranged from 3 to 40 wk ($M = 9.5$, $Mdn = 8$). Number of CBT sessions ranged from 3 to 40 ($M = 13.5$, $Mdn = 14.3$). Session length not specified. *Improvement:* Significantly improved ADL outcomes for the intervention group compared with the control group (moderate to large effect size).
Unilateral Spatial Neglect Intervention for ADLs		
B: Moderate	*Recommendation:* Practitioners could consider providing activity-based interventions (e.g., computer-based training for visual scanning training and optokinetic stimulation, mental practice, MT, voluntary trunk rotation, vestibular rehabilitation) for adults with unilateral spatial neglect poststroke to improve ADL performance (dose: 5–30 sessions, 2–10×/wk, 1 hr 45 min to 30 hr, for 4 days–5 wk)	

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Table 1. Clinical Recommendations for Interventions to Improve ADL and FM Outcomes (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
1a Meta-analysis Australia	K. P. Y. Liu et al. (2019)	*Population:* Individuals with USN or hemianopsia after stroke. 20 RCTs (N = 594 participants), 5 activity-based intervention studies (N = 156 participants), and 4 combined activity–nonactivity intervention studies (N = 105 participants) included in meta-analysis of ADL outcomes. *Setting:* Hospital, rehabilitation center, research center *Intervention:* 1. *Activity-based interventions:* computer-based training for visual scanning training and optokinetic stimulation, mental practice, MT, voluntary trunk rotation, vestibular rehabilitation 2. *Combined activity–nonactivity interventions:* electrical somatosensory stimulation with visual scanning training, hemifield eye patching with cognitive-based rehabilitation, voluntary trunk rotation, optokinetic stimulation, or conventional OT; prismatic glasses with visual scanning training 3. *Control group:* a variety of interventions, including conventional therapy, conventional OT, computerized cognitive rehabilitation, visual scanning training, exploration training, and task-specific activities. *Delivery method:* Individual *Dose:* Ranged from 5 to 30 sessions, 2–10×/wk for 1 hr 45 min to 30 hr, for 4 days–5 wk *Improvement:* Only activity-based interventions had a moderate effect on improving ADL outcomes for people with USN.
Recreational Interventions for ADLs and FM		
B: Moderate	*Recommendation:* Practitioners could consider using recreational interventions such as music, horseback riding, and other creative arts activities to improve ADL performance of adults poststroke (dose: 90- to 240-min sessions, 2×/wk, for 4–12 wk)	
1b 3-arm RCT Sweden	Bunketorp-Käll et al. (2017, 2019)	*Population:* N = 123 participants with stroke with hemispheric symptoms *Setting:* Community *Intervention:* 1. R-MT used rhythm, music, color, and movement. Participants performed rhythmic movements with their hands and feet while listening to music. 2. H-RT included preparing the horse for riding, completion of tailored exercises (balance, trunk rotation, goal-oriented movement, cognition) while the horse was moving, and relaxation and body awareness. 3. Control group received R-MT after 1-yr delay. *Delivery method:* Group *Dose:* R-MT: 2 90-min sessions/wk for 12 wk H-RT: 2 240-min sessions/wk for 12 wk *Improvement:* R-MT and H-RT groups improved significantly compared with the control group in ADL performance over 3 time points—postintervention, 3 mo, and 6 mo. The H-RT group also had significantly improved balance and FM compared with the other 2 groups.
1b RCT Thailand	Kongkasuwan et al. (2016)	*Participants:* N = 118 stroke patients in a hospital inpatient rehabilitation unit (ages ≥50 yr). *Setting:* Inpatient rehabilitation *Intervention:* Creative art intervention in addition to physical therapy.

(*Continued*)

Table 1. Clinical Recommendations for Interventions to Improve ADL and FM Outcomes (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
		Intervention included meditation with music, warm-up activity, main activity, and group singing activity and a group-healing circle. Control group received conventional PT only. *Delivery method:* Group *Dose:* Intervention group received creative arts therapy in addition to PT 2×/wk for 4 wk (8 1.5- to 2-hr sessions). *Improvement:* The intervention group improved significantly in ADL performance compared with the control group.
AO With TOT for ADL and FM		
B: Moderate	*Recommendation:* Practitioners could consider providing AO along with TOT to improve ADLs and FM of adults with acute and subacute stroke (dose: 20–90 min/session, 3–6 days/wk, for 3–8 wk).	
1a Meta-analysis Taiwan	Peng et al. (2019)	*Population: N* = 600 adults at acute and subacute stages of stroke. *Setting:* Rehabilitation centers *Intervention:* 17 trials of AO, through observation of another individual performing ROM, reaching and grasping, or functional tasks by video, followed by a physical activity *Delivery method:* Individual *Dose:* Varied; 20–90 min/session, 3–6 days/wk, for 3–8 wk *Improvement:* Significant improvements in ADLs in the intervention group compared with the control group (4 studies; *N* = 226; moderate to large effect size). Significant improvement in FM (8 trials; *N* = 220) in the intervention group compared with the control group (moderate to large effect size).
Tai Chi for ADLs and FM		
B: Moderate	*Recommendation:* Practitioners could consider providing or recommending Tai Chi for adults with subacute or chronic stroke to improve ADL and FM outcomes in inpatient (or other) settings (dose: 15–60 min, 5×/wk, for 2–12 wk)	
1a Meta-analysis China	Lyu et al. (2018)	*Population: N* = 1,293 (21 trials); stage of stroke varied *Setting:* Not reported *Intervention:* All types of Tai Chi *Delivery method:* Not reported *Dose:* Not reported *Improvement:* Significant improvement in the intervention group over the control group in ADLs (2 studies; *N* = 166) and in FM (2 studies, Tai Chi vs. conventional rehabilitation; 4 studies, Tai Chi + conventional rehabilitation vs. conventional rehabilitation alone).
1b RCT Taiwan	Chen et al. (2019)	*Population: N* = 72 adults with subacute stroke *Setting:* Inpatient rehabilitation *Intervention:* Mind–body interactive exercise program (Chan-Chuang qigong exercise: lifting ball posture, holding tree trunk posture, pressing ball posture, and pushing posture and calm breathing and relaxation) *Delivery method:* Individual *Dose:* ≥15 min/day for 10 days

(*Continued*)

Table 1. Clinical Recommendations for Interventions to Improve ADL and FM Outcomes (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
		Improvement: Significant improvement in ADL outcomes among the intervention group compared with the control group.
1b RCT China	Xie et al. (2018)	*Population:* $N = 72$ adults with chronic stroke *Setting:* Community setting *Intervention:* Tai-Chi Yunshou exercise plus health education *Delivery method:* Individual *Dose:* 60-min session, 5×/wk, for 12 wk *Improvement:* None.
Aquatic Therapy or Hydrotherapy for ADLs and FM		
B: Moderate	*Recommendation:* Practitioners could consider providing hydrotherapy in an outpatient or community setting for adults with subacute or chronic stroke to improve ADL and FM outcomes (dose: 2–5 30- to 60-min sessions/wk for 2–8 wk).	
1a Meta-analysis Korea	Chae et al. (2020)	*Population:* $N = 325$ adults with subacute or chronic stroke (11 trials) *Setting:* Interactive therapy lab and recreation room *Intervention:* Hydrotherapy (exercise performed underwater) *Delivery method:* Not reported *Dose:* 2–5 30- to 60-min sessions/wk for 2–8 wk *Improvement:* Significant improvement in the intervention group over the control in ADLs (2 studies; $N = 166$) and FM (2 studies, hydrotherapy vs. conventional; 4 studies, hydrotherapy + conventional vs. conventional alone).
OT-Provided ADL Interventions		
B: Moderate	*Recommendation:* Practitioners could consider using OT ADL training strategies (remediation, adaptation, technology, environmental modification) to improve ADL performance of people poststroke at all stages of recovery (dose unspecified).	
1a Meta-analysis Korea	Chae et al. (2020)	*Population:* $N = 325$ adults with subacute or chronic stroke (11 trials) *Setting:* Interactive therapy lab and recreation room *Intervention:* Hydrotherapy (exercise performed underwater) *Delivery method:* Not reported *Dose:* 2–5 30- to 60-min sessions/wk for 2–8 wk *Improvement:* Significant improvement in the intervention group over the control group in ADLs ($N = 166$): FM improvement from 2 studies that used hydrotherapy vs. conventional rehabilitation and from 4 studies that used hydrotherapy + conventional rehabilitation vs. conventional rehabilitation alone.
Home-Based Exercise and ADL Interventions for ADLs		
B: Moderate	*Recommendation:* Practitioners could consider providing a home-based audiovisual program, including exercises and performing ADLs (food preparation, dressing, mobility) for people at the subacute stage poststroke (dose: 1-hr session 1×/wk for 6 mo)	
1b RCT	Chaiyawat & Kulkantrakorn (2012)	*Population:* $N = 60$ individuals with MCA stroke living at home *Setting:* Home

(*Continued*)

Table 1. Clinical Recommendations for Interventions to Improve ADL and FM Outcomes (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
Thailand		*Intervention:* Home-based individualized audiovisual program consisting of passive, active, and resistive exercises and ADLs, such as preparing a drink, using a key in a lock, donning and doffing shoes, using cane or wheelchair. *Delivery method:* Individual, in person *Dose:* 1-hr session 1×/mo for 6 mo *Improvement:* ADL performance improved.
ADL Training Before Discharge Home		
B: Moderate	*Recommendation:* Practitioners could consider providing home-based ADL training before discharge from inpatient rehabilitation and home-based care after discharge to improve ADL and mobility performance (dose: 1-hr sessions, 1–3×/wk until discharge, 1-hr sessions 1–5×/wk for 4 wk after discharge).	
1b RCT Denmark	Rasmussen et al. (2016)	*Population:* $N = 71$ adults with stroke admitted to inpatient stroke unit *Setting:* Inpatient rehabilitation and home *Intervention:* Before discharge from hospital, participants received care from a multidisciplinary inpatient rehabilitation team. As an inpatient, the participant was driven home 1–3×/wk to perform exercises and ADLs before returning to the hospital. After discharge, participants received home-based rehabilitation for 4 wk. They were given written plans for training sessions, received help to perform ADLs, and continued rehabilitation training at home 1–5 days/wk. *Delivery method:* Individual, in person *Dose:* During inpatient stay, 60-min session of exercise and ADL training 1–3×/wk. After discharge, received 60-min session of rehabilitation training 1–5 days/wk for 4 wk. *Improvement:* ADL and FM performance improved.
Home-Based ADL Training and Education		
B: Moderate	*Recommendation:* Practitioners could consider providing home-based ADL training and education to improve ADL performance for people poststroke discharged from acute care (2-hr sessions, 1×/wk, for 6 wk)	
1b RCT Iran	Sahelbalzamani et al. (2009)	*Population:* $N = 80$ adults (age range = 40–70 yr) with hemiplegia poststroke *Setting:* Home health after discharge from acute care *Intervention:* Education (skill and booklet) in individual hygiene, bathing, nutrition, toileting, grooming, dressing, bowel and bladder control, mobility, wheelchair use, transferring to and from chair to bed. *Delivery method:* Individual, in person *Dose:* 2-hr session 1×/wk for 6 wk *Improvement:* Participants improved in all areas of ADLs except for bowel and bladder management.
VR Interventions for ADLs		
B: Moderate	*Recommendation:* Practitioners could consider using technology to improve ADL performance of people ≥3 mo poststroke in a variety of settings (inpatient rehabilitation, outpatient; dose: 30 min/day, 3 days/wk, for 4 wk; total hours of treatment: <5 hr [$n = 13$]; 6–10 hr [$n = 25$]; 11–20 hr [$n = 26$]; >21 [$n = 7$]; 1 study had a low-intensity group [4 hr] and a high-intensity group [10 hr]).	

(*Continued*)

Table 1. Clinical Recommendations for Interventions to Improve ADL and FM Outcomes (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
1a Systematic review with meta-analysis United States and Canada	Laver et al. (2017)	*Population:* $N = 2{,}470$ (across 72 trials; varies by study) stroke patients in a variety of settings, at a variety of stages poststroke, participating in VR intervention *Setting:* Varied *Intervention:* Five intervention approaches using VR (varies by study) were used: activity retraining ($n = 4$); upper limb training ($n = 35$); lower limb, balance, and gait training ($n = 23$); global motor function training ($n = 10$); cognitive–perceptual training ($n = 1$). 22 studies used commercially available gaming consoles (e.g., Playstation EyeToy, Nintendo Wii, Microsoft Kinect); 8 used Gesturetek IREX; 1 used the Armeo; 1 used the CAREN system; 1 used the Lokomat; and the remaining studies used customized VR programs. *Delivery method:* Varied by study *Dose:* Varied. Total hours of treatment: <5 hr ($n = 13$); 6–10 hr ($n = 25$); 11–20 hr ($n = 26$); >21 hr ($n = 7$); 1 study had a low-intensity group (4 hr) and a high-intensity group (10 hr). *Improvement:* Pooled analysis from 10 trials with 466 participants found statistically significant findings favoring the impact of VR on ADL performance.
1b RCT Taipei	Lin et al. (2015)	*Population:* $N = 33$ ≥3 mo poststroke, with the ability to flex and extend the paretic arm and hand *Setting:* Inpatient rehabilitation *Intervention:* Bilateral isometric handgrip force training while seated at an LCD screen in which the individual gradually increased or decreased their grip to track the trajectory of the targeted force *Delivery method:* Individual, in person *Dose:* 30 min/day, 3 days/wk, for 4 wk *Improvement:* Statistically significant improvements in favor of the intervention for ADL performance compared with the control.
Preparatory Methods: Early Mobilization for ADLs		
B: Moderate	*Recommendation:* Practitioners could consider providing mobilization, within the 1st 24 hr after stroke onset, during acute care, to improve ADL performance (dose: 5–30 min, 2×/day, for 7–14 days, depending on discharge).	
1b RCT India	Chippala & Sharma (2016)	*Participants:* $N = 86$ (age >18 yr) with acute stroke, admitted within 24 hr of symptom onset *Setting:* Acute care inpatient *Intervention:* Upright and out-of-bed activities started as soon as practical after recruitment and determined by patient's tolerance *Delivery method:* Individual *Dose:* 5–30 min, 2×/day, for 7 days or until discharge (whichever was sooner) *Improvement:* Significant improvement in ADL performance at discharge as well as at 3-mo follow-up, in favor of the intervention compared with usual care.

(*Continued*)

Table 1. Clinical Recommendations for Interventions to Improve ADL and FM Outcomes (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
Preparatory Methods: PROM for ADLs		
B: Moderate	*Recommendation:* Practitioners could consider providing PROM for acute stroke patients in intensive care to improve self-care performance (dose: 15 min, 2×/day, 5 days/wk for 4 wk)	
1b RCT Korea	Kim et al. (2014)	*Population:* N = 37 acute stroke patients with muscle strength <Grade 3. *Setting:* Neuroscience intensive care unit *Intervention:* PROM performed with bilateral upper extremities *Delivery method:* Individual *Dose:* 15-min session 2×/day, 5 days/wk, for 4 wk *Improvement:* Significant improvement in self-care for the intervention group compared with the usual-care control group.
Preparatory Methods: Sensory Retraining for ADLs		
B: Moderate	*Recommendation:* Practitioners could consider providing various types of sensory retraining to improve ADL performance for leg somatosensory impairment for people in inpatient rehabilitation (dose: varies per study; 20- to 45-min sessions, 2–5×/wk, for 2–9 wk)	
1a Systematic review with meta-analysis Numerous countries (9)	Chia et al. (2019)	*Population:* N = 430 adults age ≥18 yr with leg somatosensory impairment after stroke *Setting:* Eight of 16 studies were set in inpatient rehabilitation *Intervention:* Varies per study; compelled body weight shift (N = 2 studies); assisted movement with enhanced sensation + EMG feedback (N = 1 study); Nintendo Wii (N = 1 study); underwater unstable surface (N = 1 study); education and proprioception training on affected foot (1 study); proprioception, localization, vibration, pressure discrimination, and TENS + NDT (N = 1 study); AROM and PROM of affected leg (N = 1 study); motor imagery + proprioceptive training (N = 1 study); education, detection, localization, discrimination, and proprioception of the affected big toe and ankle (N = 1 study); aerobic deep-water walking (N = 1 study); treadmill training with eyes closed (N = 1 study); hardness discrimination perceptual learning exercises (N = 1 study); TENS using sock electrode on affected foot (N = 2 studies) *Delivery method:* Individual, in person *Dose:* Varies per study; 20- to 45-min sessions, 2–5×/wk, for 2–9 wk *Improvement:* Significant improvement in ADL performance and balance in the intervention group compared with the control group.

Note: All studies included had statistically significant positive outcomes related to the interventions discussed. ADL/ADLs = activities of daily living; AO = action observation; AROM = active range of motion; CAREN = Computer-Assisted Rehabilitation Environment; CBT = cognitive–behavioral therapy; EMG = electromyography; e-stim = electrical stimulation; FM = functional mobility; HEISS = Health Empowerment Intervention for Stroke Self-Management; H-RT = horse-riding therapy; ICH = intracerebral hemorrhage; IREX = Immersion Rehabilitation Exercise; MCA = middle cerebral artery; *Mdn* = median; MI = mental imagery; MT = mirror therapy; NDT = neurodevelopmental treatment; OT = occupational therapy; PCSMEI = Patient-Centered Self-Management Empowerment Intervention; PROM = passive range of motion; PT = physical therapy; RCT = randomized controlled trial; R-MT = rhythm and music therapy; ROM = range of motion; TENS = transcutaneous electrical nerve stimulation; TOT = task-oriented training; USN = unilateral spatial neglect; VR = virtual reality.

1. Exactly what intervention do I need to provide?
   - What types of client outcomes am I looking for?
   - Do the studies I've located provide enough detail on the intervention so that I know what to do and how to do it?
2. How well do the conditions in which I will provide the intervention match those in the studies?
   - What are the demographic characteristics (e.g., age, gender, diagnosis, comorbidities) of the participants in the studies?

Table 2. Clinical Recommendations for Interventions to Improve IADL Outcomes

Grade/Evidence Level	Citation	Intervention Details
CIT Interventions		
A: Strong	*Recommendation:* Practitioners should consider providing CIT alone or in combination with other interventions (self-regulation, trunk restraint, robotic therapy) during inpatient rehabilitation to improve IADL performance and mobility after stroke (dose: 1–2-hr sessions, 5×/wk, 2–4 wk).	
1b RCT China	Liu et al. (2016)	*Participants:* $N = 86$, stroke onset <3 mo *Setting:* Inpatient rehabilitation *Intervention:* Self-regulatory and mCIMT: restraint of the nonimpaired limb for 4 hr/day, but instead of demonstration and practice protocols, patients were taught to use the self-regulation strategy (i.e., self-reflection on abilities and deficits in task performance, identifying problems and solutions, and practice of the adapted tasks). *Delivery method:* Individual, in person *Dose:* 10 1-hr sessions, 5×/wk, for 2 wk *Improvement:* IADL performance improved.
1b RCT Taiwan	Wu et al. (2012)	*Participants:* $N = 57$, >6 mo after stroke *Setting:* Rehabilitation hospital *Intervention:* dCIT with TR training of the affected UE included shaping skills and repetitive practice of functional tasks; TR harness secured the trunk to the back of the chair; the unaffected hand was restrained in a mitt for 6 hr/day for 3 wk. *Delivery method:* Individual, in person *Dose:* 2-hr sessions, 5×/wk, for 3 wk *Improvement:* Participation in IADL tasks and outdoor activities.
2b RCT Taiwan	Hsieh et al. (2016)	*Participants:* $N = 34$, >6 mo poststroke *Setting:* Rehabilitation hospital *Intervention:* For the first 2 wk, participants in RT + mCIT group received RT, using the same treatment principles as those in the RT group. RT was followed by 2 wk of a form of mCIT with reduced training and restraint time compared with the original CIT. Treatment components included repetitive training of the affected UE in functional tasks with behavior shaping. A mitt was used to restrict the unaffected hand for 6 hr/day. Some strategies of transfer package applied to facilitate the use of the affected UE included behavioral contract, home diary, and problem-solving mentoring. *Delivery method:* Individual, in person *Dose:* 90- to 105-min session, 5×/wk, for 4 wk *Improvement:* Independence in IADLs improved.
2b RCT Taiwan	Lin et al. (2009)	*Participants:* $N = 32$, >6 mo poststroke *Setting:* Rehabilitation setting *Intervention:* Included functional training of the affected limb. Shaping, adaptive, and repetitive practice of functional tasks included dialing a phone number, reaching forward to move a jar from one place to

(*Continued*)

Table 2. Clinical Recommendations for Interventions to Improve IADL Outcomes (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
		another, picking up a cup and drinking from it, and other activities similar to those performed on a daily basis. *Delivery method:* Individual, in person *Dose:* 2-hr session, 5×/wk, for 3 wk *Improvement:* Functional mobility improved.
Medication Management		
B: Moderate	*Recommendation:* Practitioners could consider providing medication management interventions (text reminders, environmental cues) for people after stroke who live at home to improve medication adherence (dose: 2 in-person sessions or multiple text messages over 8 wk)	
1b RCT Pakistan	Kamal et al. (2015)	*Participants: N* = 200, postacute (>4 wk poststroke) *Setting:* Outpatient *Intervention:* In addition to usual care, this group received text reminders customized to their individual prescription. The participants were required to respond to the text stating whether they had taken their medicines. Moreover, twice-weekly health information text messages were also sent to the intervention group. Health information text messages were customized according to medical and drug profiles of every patient by the research team. *Delivery method:* Individual, remote *Dose:* Text for every dose, and health information texts 2×/wk for 8 wk *Improvement:* Medication adherence improved.
2b Pilot RCT Scotland	O'Carroll et al. (2013)	*Participants: N* = 62, discharged home on preventive stroke medicine *Setting:* Home based *Intervention:* Two-session intervention aimed at increasing adherence by (1) introducing a plan linked to environmental cues (implementation intentions) to help establish a better medication-taking routine (habit) and (2) eliciting and modifying any mistaken patient beliefs regarding medication or stroke. *Delivery method:* Individual, in person *Dose:* 2 brief sessions, 2 wk apart, for 3 mo, with assessment after both sessions. *Improvement:* Medication adherence improved.
Driving Intervention		
B: Moderate	*Recommendation:* Practitioners could consider the use of driving simulation interventions to improve driving performance of people living at home poststroke (dose: 1-hr sessions, 3×/wk, for 5 wk)	
1b RCT Belgium	Devos et al. (2009)	*Participants: N* = 83 subacute participants (age = <75 yr) *Setting:* Rehabilitation clinic *Intervention:* Simulator-based driving training; trained in a stationary full-bodied Ford Fiesta 1.8 with automatic gear transmission and all of its original mechanical parts. Life-size computer-generated images were projected onto a flat screen with a horizontal visual angle of 45°. Tailor-made, interactive driving scenarios were developed using the Scenario Definition Language from STISIM Drive System (Version 1.03; Systems

(*Continued*)

Table 2. Clinical Recommendations for Interventions to Improve IADL Outcomes (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
		Technology Inc., Hawthorne, CA). *Delivery method:* Individual, in person *Dose:* 1-hr sessions, 3×/wk, for 5 wk *Improvement:* On-road performance improved at conclusion of intervention and 6 mo later. Anticipation and perception of signs, visual behavior and communication, quality of traffic participation, and left-turn performance improved at conclusion of the intervention.
Community-Based Health Empowerment Group		
B: Moderate	*Recommendation:* Practitioners could consider providing a health empowerment intervention to improve IADL performance (short and long term) for people living at home after stroke in the subacute stage (dose: 60-min session, 1×/wk, for 6 wk and home follow-up support).	
1b RCT Hong Kong	Sit et al. (2016)	*Participants: N* = 210 stroke survivors attending the ambulatory rehabilitation center of a subacute hospital *Setting:* Subacute hospital and home based *Intervention:* HEISS. Part 1: 6 weekly small-group sessions from Wk 3 to Wk 8 in parallel with the ambulatory rehabilitation schedule (usual care). Groups focused on personal goal setting and action planning, self-efficacy activities to develop self-management skills, and articulating participants' health needs with their personal resources for goal attainment. Part 2: Home-based implementation during Wk 9–13 with biweekly telephone follow-up calls to the participants. *Delivery method:* Group (with individual home follow-up), in person *Dose:* 1 60-min, small-group session/wk and home-based implementation with short biweekly telephone follow-up call for 6 wk *Improvement:* IADL performance improved at 1 wk, 3 mo, and 6 mo postintervention.

Note. CIT = constraint-induced therapy; dCIT = distributed constraint-induced therapy; HEISS = Health Empowerment Intervention for Stroke Self-management; IADL/IADLs = instrumental activities of daily living; mCIMT = modified constraint-induced movement therapy; RCT = randomized controlled trial; RT = robotic therapy; TR = trunk restraint; UE = upper extremity.

- In which setting (e.g., inpatient, home, community, school) did the studies take place?
- Do any contextual factors (e.g., resources, policies) that are different from those in the studies influence my ability to provide the intervention?

3. How flexible is the intervention, and how much can I modify or adapt it?
   - If my setting or client population differs from those of the studies, can I modify or adapt the intervention without changing its integrity?
   - If I modify or adapt the intervention, what client characteristics (e.g., comorbidities) do I need to consider?
   - Can I be proactive and plan how to modify or adapt the intervention before I start implementing it?
   - Can I make minimal changes to the intervention, such as reordering the content of the sessions, or does the need for substantial changes indicate that I should select another intervention?

To modify or adapt evidence-based interventions in practice, practitioners must plan and proactively think through the changes they need to make to fit the intervention to the client and the practice setting. In addition, they must document how and why they altered the researched intervention so others in their setting know how to implement the intervention and why the changes were made. If an intervention must be adapted extensively, it may not be the right fit for the situation. If extensive adaptations to the intervention are necessary, the intervention is probably not right for the client or setting. If the practitioner finds that the intervention does not suit the client, they should not use that intervention. Clinical interventions should be as similar as possible to the interventions used in the research.

Case Studies and Evigraphs

The case studies presented in these Practice Guidelines illustrate how occupational therapy practitioners can

Table 3. Clinical Recommendations for Interventions to Improve Social Participation

Grade/Evidence Level	Citation	Intervention Details
Occupation-Based Interventions for Social Participation Outcomes		
B: Moderate	*Recommendation:* Practitioners could provide multimodal stroke education (e.g., written material, lectures) with supportive follow-up (telephone, internet) to improve social participation outcomes for adults after stroke (1 session before discharge and multiple phone and home follow-up (6 mo) or mix of group training 1 hr, 2×/wk, and home training 1.5 hr, 5×/wk, for 3 mo).	
1b RCT China	Geng et al. (2019)	*Participants: N* = 60; age ≥60 yr; first stroke, either hemorrhagic or ischemic; ability to communicate; cognitive competence with Mini-Mental State Examination score ≥20; slight to moderate level of disability; and scheduled to discharge from hospital to home *Setting:* Inpatient rehabilitation and postdischarge home *Intervention:* Routine stroke education before hospital discharge, telephone follow-up call 1 wk postdischarge, and routine check-up with their doctor postdischarge. TC nurses visited participants' homes weekly and conducted weekly telephone follow-up calls to assess patients' and caregivers' needs 1–3 mo after discharge. *Delivery method:* Individual *Dose:* TC intervention included 30-min education by a neurologist and nurse practitioner on recovering after stroke 1 day before discharge. Multiple home and telephone follow-ups postdischarge. *Improvement:* Improvements were seen in social participation, lasting ≤6 mo postdischarge.
2b Pilot RCT China	Ru et al. (2017)	*Participants: N* = 964 (age <75 yr); diagnosis of stroke confirmed with CT and MRI; unilateral limb dysfunction; absence of serious cardiac conditions; absence of prior sensory aphasia, severe mental disorder, or cognitive impairment. *Setting:* Community based *Intervention:* Comprehensive stroke rehabilitation education protocol consisting of textbooks, brochures, flyers, bulletins, seminars, lectures, and health advisory activities. Participants were grouped according to functional limitations (abilities). Rhyming words were used to help patients coordinate and control movements. *Delivery method:* Group *Dose:* Group training 2×/wk for 1 hr and home-based training 5×/wk for 1.5 hr, both over the course of 3 mo. *Improvement:* Social participation improved.
Impairment-Based Interventions to Improve Social Participation		
B: Moderate	*Recommendation:* Practitioners could use standard OT plus the RAPAEL® Smart Glove (Neofect, Watertown, MA) with sensor device and training games to improve participation for adults poststroke in the inpatient rehabilitation setting (dose: 5×/wk for 4 wk).	
1b RCT Korea	Shin et al. (2016)	*Participants: N* = 46 poststroke with minimal cognitive impairments *Setting:* Inpatient rehabilitation *Intervention:* Standard OT (ROM, strengthening, ADLs), plus RAPAEL Smart Glove with sensor device and software application. Participants played training games involving the forearm, wrist, hand, and fingers. Games used an algorithm to adjust difficulty level and ROM. *Delivery method:* Individual

(*Continued*)

Table 3. Clinical Recommendations for Interventions to Improve Social Participation (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
		Dose: Standard OT (30 min 5 days/wk for 4 wk) + additional 30 min with RAPAEL glove (5 days/wk for 4 wk) *Improvement:* Activity participation significantly improved
B: Moderate	*Recommendation:* Practitioners could provide group CBT (45 min) addressing balance self-efficacy and task-oriented balance training (45 min) to improve community integration for adults poststroke (dose: 90-min sessions 2×/wk for 8 wk)	
1b RCT Hong Kong	K. P. Y. Liu et al. (2019)	*Participants: N* = 89 with single stroke in previous 1–6 yr, ability to walk 10 m independently *Setting:* Laboratory *Intervention:* 45 min of group-based CBT with the purpose of improving balance self-efficacy and 45 min of task-oriented balance training *Delivery method:* Group *Dose:* 90-min session 2×/wk for 8 wk *Improvement:* Social participation and community integration improved. Decreased fear of falling was also noted.
B: Moderate	*Recommendation:* Practitioners could provide a long-term (6-mo) group intervention in a community setting that includes walking and strength and balance exercises to improve social participation for adults poststroke (dose: 1 hr/day 3 days/wk for 6 mo)	
1b RCT Italy	Stuart et al. (2009)	*Participants: N* = 92. Chronic phase of stroke recovery (>9 mo poststroke), mild to moderate hemiparetic gait, age >39 yr, no aphasia with inability to follow 2-step commands *Setting:* Community based *Intervention:* Stroke program, group classes of 9–13 people for 6 mo. Program included walking, strength, and balance training exercises. *Delivery method:* Group, community based *Dose:* 1 hr/day 3 days/wk for 6 mo *Improvement:* Social participation significantly improved.

Note. ADLs = activities of daily living; CBT = cognitive–behavioral therapy; CT = computerized tomography; MRI = magnetic resonance imaging; OT = occupational therapy; RCT = randomized controlled trial; ROM = range of motion; TC = transitional care.

translate evidence from the systematic reviews to their professional practice when collaborating with people with stroke. Each case study highlights interventions that are supported by evidence and expert opinion. Included with the case studies are decision-making evidence graphics (evigraphs; Figures 1–4) developed by the authors and AOTA staff on the basis of the clinical recommendations. Evigraphs are presented in relation to clinical recommendations for improving ADLs and functional mobility (Figure 1), IADLs (Figure 2), social participation (Figure 3), and participation in the caregiver role (Figure 4).

Evigraphs based on clinical recommendations were developed to assist practitioners with clinical decision making. Practitioners must consider each potential intervention in relation to the client's individual goals, interests, habits, routines, and environment and choose interventions that strongly align with or are supportive of these factors in the context of the client's occupational profile. It is important to note that the evigraphs in these Practice Guidelines present simplified examples of the decision-making processes occupational therapy practitioners might use to address their specific clients' goals in relation to the setting.

Case Study 1: Michelle

Occupational Profile

Michelle is a 55-yr-old woman who sustained an ischemic left cerebrovascular accident (CVA) of the internal carotid artery. She has a past medical history of hypertension, diabetes, and depression. One week ago, while cooking dinner in her apartment, she felt dizzy, weak, and unable to keep her balance. Michelle's wife, Chloe,

Table 4. Clinical Recommendations for Interventions to Improve Participation in the Caregiver Role

Grade/Evidence Level	Citation	Intervention Details
Combined Problem-Solving and Other CBT Techniques		
A: Strong	*Recommendation*: Practitioners should consider providing problem-solving therapy skills training and other CBT techniques (modeling, reinforcement, stress management, reframing negative thoughts) to improve caregiver depression, health, and satisfaction (dose: 1–2 in-person sessions [home or during inpatient stay] and telephone follow-up for 3–12 mo)	
1b RCT Germany, United States	Pfeiffer et al. (2014)	*Participants:* $N = 122$ caregivers *Setting:* Home *Intervention:* Training in problem-solving skills steps and the following CBT techniques: role-playing, modeling, shaping, reinforcement, and cognitive restructuring *Delivery method:* In person, in home, and then telephone follow-up *Dose:* 1 home visit postdischarge, 9 weekly telephone calls over 3 mo, 1 additional home visit, and then 9 monthly telephone sessions for ≤12 mo *Improvement:* At 3 mo, caregivers had significantly lower depression, fewer physical complaints, and higher satisfaction with leisure time compared with preintervention; at 12 mo, they continued to have significantly lower depression and fewer health symptoms.
1b RCT United States	King et al. (2012)	*Participants:* $N = 255$ caregivers *Setting:* Inpatient and home *Intervention:* Combined problem-solving training; skills training; and the CBT techniques of stress management, relaxation training, reframing negative thoughts, and mood rating *Delivery method:* In person, inpatient, with home-based telephone follow-up *Dose:* First 2 sessions (length not reported) were in-person, inpatient, and Sessions 3–7 were conducted by telephone over 3 mo. *Improvement:* Significantly lower depression, life change, and health symptoms at 3 mo (but no statistically significant differences between groups by 6 mo postdischarge).
Combined Problem-Solving and Stroke Education		
A: Strong	*Recommendation*: Practitioners should consider using stroke education in addition to problem-solving skills training, during or immediately after discharge from inpatient care, with long-term follow-up (3–6 mo), to improve caregiver outcomes (satisfaction, burden; dose: in-person and remote sessions or remote-only [phone] sessions, weekly or biweekly for 2–6 mo)	
1b RCT Hong Kong	Cheng et al. (2018)	*Participants:* $N = 128$ caregiver–patient dyads *Setting:* Inpatient predischarge and home postdischarge *Intervention:* Problem-solving therapy skills training to improve cognitive and behavioral skills for addressing consequences of stroke and stroke education in

(*Continued*)

Table 4. Clinical Recommendations for Interventions to Improve Participation in the Caregiver Role (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
		caregiving techniques and stroke information *Delivery method:* In person and telephone follow-up *Dose:* 2 in-person education sessions during inpatient stay, 6 biweekly postdischarge telephone sessions over 3 mo *Improvement*: The intervention group had significantly improved caregiving competence, problem-solving coping abilities, and satisfaction with perceived social support compared with the control group immediately after the intervention and 3 mo postintervention. Caregiver burden was also significantly lower.
1b RCT Iran	Deyhoul et al. (2020)	*Participants: N* = 90 caregiver–patient dyads *Setting:* Inpatient and home *Intervention:* Family-centered empowerment program. In the 1st 2 sessions caregivers had stroke education and skills training. The 3rd session focused on problem-solving therapy skills training. Caregivers were given stroke educational materials in the 4th session and tested on them. *Delivery method:* In person during inpatient stay, and telephone follow-up *Dose:* 4 face-to-face, daily 1-hr inpatient sessions, with telephone follow-up for 2 mo *Improvement*: Family caregiver burden was significantly less at both 2 wk and 2 mo after the intervention.
1b RCT United States	Perrin et al. (2010)	*Participants: N* = 61 caregiver–patient dyads *Setting:* Inpatient and home *Intervention:* Stroke education (effects, prevention, and recovery) and problem-solving therapy skills training *Delivery method:* Face-to-face training and stroke education before discharge and problem-solving intervention via videophone calls each week *Dose:* 1 1-hr inpatient, in-person session, 4 weekly telephone follow-up sessions for 2 mo *Improvement*: There was a significant decrease in caregiver strain at both the 1- and 3-mo follow-up assessments.
2b Pilot RCT United States	Bishop et al. (2014)	*Participants: N* = 49 caregiver–patient dyads *Setting:* Home *Intervention:* Assist the stroke survivor and caregiver to identify and address problems. Stroke-related education and packets of information and resources were provided as references for problems that were identified. *Delivery method:* Telephone *Dose:* 13 calls with caregiver over 6 mo, starting

(*Continued*)

Table 4. Clinical Recommendations for Interventions to Improve Participation in the Caregiver Role (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
		postdischarge from inpatient rehabilitation *Improvement*: Caregivers self-reported significantly higher scores on family functioning, their own functional independence (i.e., caregivers' ADLs while caring for the stroke survivor), and criticism of self at 3 mo and 6 mo postdischarge.
FSO		
A: Strong	*Recommendation*: Practitioners should consider providing tailored, long-term (9-mo) support (case management, information, discharge, service connections, liaison) to help to improve caregiver knowledge, QOL, and social activity pre- and postdischarge (dose: as needed over 9 mo)	
1a Systematic review United Kingdom	Lincoln et al. (2003)	*Participants: N* = 250 caregivers *Setting:* Inpatient and home *Intervention:* The FSO was available to provide education and support before discharge, at home, and via telephone, as well as acting as a liaison with other services. FSOs provided information, attended case conferences, assisted with hospital discharge, and conducted home visits to discuss problems and offer information for ≤9 mo poststroke. *Delivery method:* Support before hospital discharge and postdischarge home visits and telephone calls *Dose:* Variable, as needed for 9 mo *Improvement*: Significant improvement in caregiver knowledge at both 4 and 9 mo (not mood or strain).
1a Systematic review United Kingdom	Mant et al. (2000)	*Participants: N* = 267 caregivers *Setting:* Inpatient and home *Intervention:* The FSO was available to provide education and support before discharge, at home, and via telephone, as well as acting as a liaison with other services. *Delivery method:* Support before hospital discharge and postdischarge home visits and telephone calls *Dose:* Variable, as needed for 9 mo *Improvement*: Statistically significant improvement in the intervention group in social activity level, QOL, and other measures pertaining to maintenance of participation in the caregiving role at 6 mo.
Problem-Solving Only		
B: Moderate	*Recommendation*: Practitioners could consider providing in-person problem-solving therapy skills training and long-term telephone follow-up (3 mo), during inpatient care, immediately after discharge, or both (1 3-hr in-person session, weekly in Mo 1, biweekly in Mo 2, and once in Mo 3 postdischarge).	
2b Pilot RCT United States	Grant et al. (2002)	*Participants: N* = 74 caregivers *Setting:* Home *Intervention:* In-home problem-solving therapy skills training session

(*Continued*)

Table 4. Clinical Recommendations for Interventions to Improve Participation in the Caregiver Role (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
		Delivery method: In-person in-home and telephone follow-up *Dose:* Initial 3-hr meeting; telephone sessions weekly for 1st mo, biweekly for the 2nd mo, and once in the 3rd mo *Improvement*: Significant improvement was seen in vitality, mental health, role limitations, social problem-solving skills, negative orientation, greater caregiver preparedness, and depression at 13 wk postdischarge.
2b Pilot RCT United States	Grant (1999)	*Participants: N* = 30 caregivers *Setting:* Inpatient and home *Intervention:* In-person, inpatient problem-solving skills training for caregivers, followed up with telephone sessions *Delivery method:* In-person, inpatient setting with home-based telephone follow-up *Dose:* 3-hr inpatient training, followed up with telephone sessions weekly in 1st mo, biweekly in 2nd mo, and once in 3rd mo *Improvement*: Significantly better problem-solving skills and caregiver preparedness at 2 and 5 wk postdischarge from hospital but not at 13 wk.
Home-Based Interventions		
B: Moderate	*Recommendation*: Practitioners could consider providing long-term (6-mo) home visit interventions that include education, ADL training, community resources, stress management, problem-solving and coping strategies to improve caregiver health status, and mobilizing family support and acquiring social support (dose: as needed over 6 mo, average 16 visits, 70-min session).	
1b RCT United States	Ostwald et al. (2014)	*Participants: N* = 159 caregiver–patient dyads *Setting:* Home *Intervention:* Support and education, including topics such as ADL training with the stroke survivor, community resources education, written stroke information, stress management, problem-solving strategies, and coping strategies *Delivery method:* Home visit *Dose:* Average 16 70-min visits over 6 mo. *Improvement*: Significant improvements in self-reported health status at 6 mo and measures of mobilizing family support and acquiring social support at 12 mo.
Telephone Group Education		
B: Moderate	*Recommendation*: Practitioners could consider providing long-term (2-mo) telephone-delivered group education sessions to caregivers to improve perceived competence and burden (8 1-hr sessions over 2 mo).	
1b RCT United States	Hartke & King (2003)	*Participants: N* = 88 caregivers *Setting:* Home *Intervention:* Psychoeducational telephone support group combined with the use of home stress management

(*Continued*)

Table 4. Clinical Recommendations for Interventions to Improve Participation in the Caregiver Role (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
		techniques. Provision of educational material in a manual, and home use of a relaxation tape. *Delivery method:* Group, telephone *Dose:* 8 weekly 1-hr sessions *Improvement*: Significant improvement in caregiver sense of competence and burden.
Multimodal Caregiver Intervention		
B: Moderate	*Recommendation*: Practitioners could consider providing long-term (2–8 mo) multimodal interventions (education, stress, problem-solving, coping) in an individual format, group format, or both to improve caregiver confidence, coping, knowledge, and depression (dose: 1-hr weekly or biweekly session for 2–8 mo).	
2b Pilot RCT Netherlands	van den Heuvel et al. (2000, 2002 [follow-up])	*Participants: N* = 130 caregivers *Setting:* Home or community based *Intervention:* Counseling and support, ADL training with the stroke survivor, community resources education, written stroke information, stress management, problem-solving strategies, and coping strategies *Delivery method:* Individual or group *Dose:* 8 weekly 1-hr sessions *Improvement*: Caregivers in both types of intervention delivery (group or individual) had significantly better confidence in their knowledge and increased use of coping strategies than the control group 1 mo after program completion. At 6-mo follow-up, both intervention groups when combined had statistically significant better knowledge of patient care, coping strategies, and social support than the control group.
2b Pilot RCT Germany	Wilz & Barskova (2007)	*Participants: N* = 89 caregiver–patient dyads *Setting:* Home *Intervention:* Stroke education, rehabilitation technique information, expressing emotions, practicing cognitive restructuring, problem solving, relaxation techniques, and receiving professional support *Delivery method:* Individual home based *Dose:* 15 structured 1-hr sessions 2×/mo over 8 mo *Improvement*: Statistically significant improvements in psychological, social, and environmental QOL and improved caregiver depression levels. The caregiver outcomes were best for those caregivers whose spouse also took part.
Skills Training Before Discharge and Home Follow-Up		
B: Moderate	*Recommendation*: Practitioners could consider providing inpatient skills training (transfers, ADLs, communication, pressure ulcer prevention) for caregivers during the patient's inpatient stay with in-person home follow-up postdischarge to improve caregiver burden, QOL, anxiety, and depression (3–4 30- to 45-min session and 1 home visit).	

(*Continued*)

Table 4. Clinical Recommendations for Interventions to Improve Participation in the Caregiver Role (*Cont.*)

Grade/Evidence Level	Citation	Intervention Details
1b RCT England	Kalra et al. (2004)	*Participants: N* = 300 caregiver–patient dyads *Setting:* Inpatient and home *Intervention:* Multiple training sessions (e.g., transfers, ADLs, communication, prevention of pressure ulcers) in hospital before discharge with a single at-home follow-up visit *Delivery method:* Individual (inpatient and home postdischarge) *Dose:* 3–4 30- to 45-min training sessions with 1 at-home follow-up *Improvement*: Significant improvement in caregiver burden, QOL, anxiety, and depression.
Inpatient, Home, and Follow-Up Phone Call Intervention		
B: Moderate	*Recommendation*: Providers could consider providing educational and discharge support from inpatient to home to improve caregiver preparation, social functioning, and QOL (4–5 30-min inpatient sessions, 1 45-min telephone call, 30-min home visit at 1 wk and 1 mo postdischarge)	
1b RCT Taiwan	Shyu et al. (2008, 2010 [follow-up])	*Population: N* = 158 caregiver–patient dyads *Setting:* Inpatient and home *Intervention:* Provision of health education, referral services, and discharge planning education *Delivery method:* Hospital before discharge combined with a single telephone call and 2 home visits *Dose:* 4–5 30-min visits during hospitalization, combined with a single 30- to 45-min telephone visit at 1 wk postdischarge and 30-min home visits at 1 wk and 1 mo postdischarge *Improvement:* Statistically significant improvements in caregiver preparation scores, both self-rated and as rated by a nurse. At follow-up, there was statistically significant improvement in the intervention group, but only in social functioning of the caregiver at 3 mo and quality of care provided at 6 mo.

Note. ADL/ADLs = activities of daily living; CBT = cognitive–behavioral therapy; FSO = family support organizer; QOL = quality of life; RCT = randomized controlled trial.

helped her to the couch and realized she was slurring her words. Chloe called 911, and Michelle was rushed to the emergency room. A computerized tomography scan showed a blockage of the left internal carotid artery, and tPA was administered. She was admitted to the acute care neurological unit, medically stabilized, and discharged to inpatient rehabilitation after 1 wk.

Michelle presented with right-sided weakness and expressive aphasia. She had difficulty communicating and became easily frustrated, but she could follow two-step commands and accurately answer yes-and-no questions. Michelle lives in a two-bedroom apartment in a building with an elevator and two steps to enter. She lives with her wife Chloe and 17-yr-old daughter Jasmine, who is in high school. They have a shower–bath combo with shower curtains and a three-in-one commode from Chloe's earlier hip replacement. Michelle works full time as an assistant manager of a retail shoe store and commutes by bus, and her wife works as a teacher. Michelle had difficulty with bed mobility, transfers, and basic ADLs, such as dressing and bathing; however, she was able to groom and feed herself with set-up. Michelle's family and friends were very supportive and able to assist. Michelle enjoys cooking, reading, and painting. Michelle's goal is to take care of herself. Chloe reported that household duties were shared; she performed the cleaning and laundry, and Michelle performed money management and meal

Figure 1. Evidence-based interventions to improve ADLs and functional mobility after stroke.

Interventions	Considerations for Selection and Use	Research Settings (Interventions May Be Considered for Use in Other Settings)			
		Acute	IRF	Home	OP/Community
ITSO: Early mobilization (Chippala & Sharma, 2016)	Medical appropriateness, precautions, activity tolerance	✓			
ITSO: Upper extremity PROM (Kim et al., 2014)	Pain, positioning, tolerance	✓			
ITSO: Sensory retraining (Chia et al., 2019)	Sensation tolerance		✓		
ADL/FM: Mirror therapy with task-oriented training (Hsieh et al., 2018; Louie et al., 2019; Yang et al., 2018)	Cognition, vision, activity tolerance		✓	✓	✓
ADL/FM: Action observation with task-oriented training (Peng et al., 2019)	Activity tolerance, vision, cognition (attention)		✓		
ADL/FM: Balance training as an intervention to support occupation (Cabanas-Valdés et al., 2016, 2017; van Duijnhoven et al., 2016)	Pain, activity tolerance		✓		
FM: Mental imagery with task-oriented training (Guerra et al., 2017; Li et al., 2017)	Cognition (attention, abstraction)	✓	✓		
ADL/FM: Aquatic/hydrotherapy activity (Chae et al., 2020)	Access and comfort with aquatic exercise				✓
ADL: Home-based ADL training before discharge from inpatient rehabilitation (Rasmussen et al., 2016)	Access/facility policies and programs, patient comfort		✓	✓	
ADL: Home-based ADL training and education (Sahelbalzamani et al., 2009)				✓	
ADL: OT-provided ADL training strategies (Legg et al., 2017)			✓	✓	
ADL: Stroke self-management interventions (Chen et al., 2018; Sit et al., 2016)	Cognition				✓
ADL: CBT interventions in group or individual sessions (Wang et al., 2018)	Diagnosis of depression; cognition		✓		✓
ADL: Activity-based interventions, computer-based training for visual scanning training and optokinetic stimulation, mental practice, mirror therapy, voluntary trunk rotation, and vestibular rehabilitation (Liu et al., 2019)	Client demonstrates unilateral spatial neglect		✓		
ADL/FM: Recreational interventions such as music, horse riding, or creative arts activities (Bunketorp-Käll et al., 2017, 2019; Kongkasuwan et al., 2016)	Client interest, ability to grade activity				✓

Note. Practitioners should remain mindful of the continuum of care in the rehabilitation process and anticipate client needs when making decisions and recommendations regarding intervention planning, future therapy, and discharge disposition. As always, intervention planning should be collaborative and based on the client's goals, interests, and functional abilities, and activities should be graded to maximize participation. See Table 1 for individual study information. Not all interventions from Table 1 are included. See Table 1 and the individual studies for intervention-specific information; the shaded area of the table indicates interventions to support occupations. ADL = activities of daily living; CBT = cognitive–behavioral therapy; FM = functional mobility; IRF = inpatient rehabilitation facility; ITSO = interventions to support occupations (preparatory activities); OP = outpatient; OT = occupational therapist; PROM = passive range of motion.

Figure 2. Evidence-based interventions to improve IADLs after stroke.

Interventions	Considerations for Selection and Use	Research Settings (Interventions May Be Considered for Use in Other Settings)			
		Acute	IRF	Home	OP/Community
CIMT or CIMT in combination with other interventions: self-regulation (Liu et al., 2016); trunk restraint (Wu et al., 2012); robotic therapy (Hsieh et al., 2016); shaping, adaptive, and repetitive practice of functional tasks (Lin et al., 2009)	Client's understanding of the intensity of the intervention and active choice to participate; activity tolerance; positioning; frustration tolerance		✓		
Medication adherence via text reminders and environmental cues (Kamal et al., 2015; O'Carroll et al., 2013)	Additional supports necessary for medication management; comfort with technology (if using text intervention); tailoring environmental cues to client preferences			✓	✓
Driving simulations (Devos et al., 2009)	Need and desire to drive, cognition, vision				✓
Health empowerment group with individual follow-up (Sit et al., 2016)	Supports available for transportation to groups if needed; appropriateness of group environment			✓	✓

Note. Practitioners should remain mindful of the continuum of care in the rehabilitation process and anticipate client needs when making decisions and recommendations regarding intervention planning, future therapy, and discharge disposition. As always, intervention planning should be collaborative and based on the client's goals, interests, and functional abilities, and activities should be graded to maximize participation. See Table 2 for individual study information. See clinical recommendations table and individual studies for intervention-specific information. CIMT = constraint-induced movement therapy; IRF = inpatient rehabilitation facility; OP = outpatient.

preparation. Because Chloe has arthritis and a busy schedule as a teacher and parent, she reported being worried about caring for Michelle at home. She stated that it is very important that Michelle be able to perform medication management and other self-care tasks.

Occupational Therapy Initial Evaluation and Findings

The occupational therapist at the inpatient rehabilitation facility completed a comprehensive initial evaluation, including an occupational profile (AOTA, 2021), clinical assessments, the Inpatient Rehabilitation Facility Patient Assessment Instrument (Centers for Medicare & Medicaid Services, 2022) to determine the amount of assistance needed for self-care, the Canadian Occupational Performance Measure (COPM; Law et al., 2019) to identify and prioritize everyday issues, and the Functional Upper Extremity Levels (FUEL; Van Lew et al., 2015) to determine the functional ability of Michelle's right upper extremity. The physical therapist stated that Michelle required minimal assistance for ambulation with a hemiwalker. The speech-language pathologist recommended that the occupational therapy practitioner speak slowly, provide time for Michelle to process and answer questions, encourage conversation, and use gestures and visual aids. Table 5 summarizes the results of Michelle's initial assessment. Michelle's treatment goals were as follows:

1. Michelle will perform bathing with supervision with use of shower chair and grab bars using adaptive techniques in 2 wk.
2. Michelle will perform toilet transfer, toileting, and dressing independently with use of adaptive equipment in 2 wk.
3. Michelle will improve her ability to use her right upper extremity from use as an independent stabilizer to use as a gross assist as per the FUEL to increase independence in ADLs in 2 wk.
4. With Chloe, Michelle will prepare a simple meal with minimal assistance using adaptive techniques and equipment in 2 wk.
5. Michelle will manage medications independently using a medication organizer and smartphone cues in 2 wk.

Occupational Therapy Interventions

A multidisciplinary approach in an urban public rehabilitation hospital was used to develop Michelle's comprehensive plan, which included occupational therapy, physical therapy, social work, speech therapy, nursing, psychology, and physiatry. She was in the

Figure 3. Evidence-based interventions to improve social participation after stroke.

Interventions	Considerations for Selection and Use	Research Settings (Interventions May Be Considered for Use in Other Settings)			
		Acute	IRF	Home	OP/Community
Multimodal stroke education with supportive follow-up (Geng et al., 2019; Ru et al., 2017)	Presentation of accessible education materials tailored to client's individual physical needs; cognition		✓	✓	✓
Balance interventions: Group cognitive-behavioral interventions for balance self-efficacy and task-oriented balance training (Liu et al., 2019)	Fear of falling; appropriateness of group intervention; cognition				✓
Long-term walking, strength, and balance group intervention (Stuart et al., 2009)	Appropriateness of group activity; ability to follow 2+-step activity instructions; safety/supports in place for safe mobility				✓

Note. Practitioners should remain mindful of the continuum of care in the rehabilitation process and anticipate client needs when making decisions and recommendations regarding intervention planning, future therapy, and discharge disposition. As always, intervention planning should be collaborative and based on the client's goals, interests, and functional abilities, and activities should be graded to maximize participation. See Table 3 for individual study information. Not all interventions from Table 3 are included. See Table 3 and individual studies for intervention-specific information. IRF = inpatient rehabilitation facility; OP = outpatient.

rehabilitation unit for 2.5 wk and received occupational therapy 1.0 hr/day, 6 days/wk.

- Action observation (AO) with task-oriented training was selected to address ADLs and functional mobility (Peng et al., 2019).
- Self-regulatory modified constraint-induced movement therapy (SR–mCIMT) intervention was selected to address IADLs such as meal preparation and medication management (Liu et al., 2016).
- Self-management interventions, in collaboration with physical therapy, were used to address stroke management and prevention of further strokes (Chen et al., 2018).
- Stroke education, skills training, and problem-solving therapy before discharge were selected for Michelle and Chloe to improve Michelle's ADL performance and quality of life and to reduce Chloe's caregiver burden (Deyhoul et al., 2020).

Action Observation and Task-Oriented Training

After reviewing the clinical assessment of the affected upper extremity, the occupational therapist selected AO followed by task-oriented practice (Peng et al., 2019) to improve Michelle's upper extremity function and ADLs. The occupational therapy practitioner explained to Michelle and Chloe that AO is a multisensory approach that can be used with Michelle's affected upper extremity and performed in therapy sessions, as well as in the evenings to increase repetition. Michelle and Chloe agreed to try AO. The intervention consisted of Michelle watching videos of healthy individuals performing range-of-motion exercises and functional reaching and grasping movements followed by task practice. For instance, Michelle would watch a video of an individual reaching for a cup on a table and then practice the movement with assistance. AO was implemented in the morning for 20 min 3 days/wk (Peng et al., 2019), and Michelle and Chloe were trained in this method to perform the task in the evenings for 30 min 3–5 days/wk for 2 wk.

Self-Regulatory Modified Constraint-Induced Movement Therapy

The occupational therapist included SR–mCIMT (Liu et al., 2016) for Michelle to improve IADLs, such as meal prep, and health management occupations, for example, medication management. The intervention consisted of 1-hr sessions with the unaffected hand restrained with a mitt, thus forcing use of the affected hand during ADL and IADL activities. However, for safety, the mitt was removed for transfers and ambulation. The first 5 days focused on ADLs such as brushing teeth, upper and lower body dressing, toilet transfer, and bathing, and the remaining 5 days focused on using a phone, preparing a simple meal, folding laundry, putting clothing on hangers, sweeping the floor, and washing dishes. The focus of each session was to have Michelle reflect on her abilities and deficits in performing the tasks while using problem-solving strategies, which included identifying the problem, generating solutions, implementing one solution, and evaluating the results to achieve task independence. The occupational therapist provided guidance throughout the

Figure 4. Evidence-based interventions to support participation in the caregiver role.

Interventions	Considerations for Selection and Use	Research Settings (Interventions May Be Considered for Use in Other Settings)			
		Acute	IRF	Home	OP/Community
Problem solving and cognitive-behavioral therapy techniques in person and with telephone follow-up (King et al., 2012; Pfeiffer et al., 2014)	Caregiver reports or demonstrates changes in mood (i.e., symptoms of depression related to role)		✓	✓	
Problem-solving skills training with stroke education (Bishop et al., 2014; Cheng et al., 2018; Deyhoul et al., 2020; Perrin et al., 2010)	Ability to tailor education and problem solving to meet individual caregiver needs		✓	✓	
Family Support Organizer: Tailored long-term support before and after discharge Lincoln et al., 2003; Mant et al., 2000, 2005)	Availability of program in current setting		✓	✓	
Problem solving without additional interventions (Grant, 1999; Grant et al., 2002)	Consider additional caregiver needs		✓	✓	
Skills training (e.g., ADLs, pressure ulcer prevention, transfers, oral health care): Before and after discharge in-home follow-up (Kalra et al., 2004) and postdischarge in-home training with telephone follow-up (Kuo et al., 2016)	Tailor skills training to caregiver needs and capabilities; ensure that skills training reflects individual and family culture and preferences		✓	✓	
Home-based long-term support and education (for ADL training, problem solving, identification of caregiver supports, coping, and stress management; Ostwald et al., 2014)	Tailor to individual needs and community access; ability to maintain intervention over time			✓	
Multimodal long-term intervention (individual or group) for education, coping, problem solving, and stress management (van den Heuvel et al., 2000; Wilz & Barskova, 2007)	Tailor to individual needs and community access; ability to maintain intervention over time			✓	✓
Inpatient, home, and telephone follow-up intervention focusing on preparation for discharge, social functioning, and quality of life (Shyu et al., 2008, 2010)	Tailor to individual needs; ability to maintain intervention over time		✓	✓	
Two-month telephone education and support group with individual stress reduction techniques (Hartke & King, 2003)	Ability to participate over an extended time period			✓	

Note. Practitioners should remain mindful of the continuum of care in the rehabilitation process and anticipate client needs when making decisions and recommendations regarding intervention planning, future therapy, and discharge disposition. As always, intervention planning should be collaborative and based on the client's goals, interests, and functional abilities, and activities should be graded to maximize participation. See Table 4 for individual study information. See Table 4 and individual studies for intervention-specific information. ADLs = activities of daily living; IRF = inpatient rehabilitation facility; OP = outpatient.

session and used communication strategies recommended by the speech-language pathologist to facilitate Michelle's learning. Michelle's unaffected arm was also restrained for an additional 3 hr a day with supervision of the nurse and family (Liu et al., 2016). Michelle and Chloe were taught that they could use the mitt in the evening while performing the AO intervention.

Patient-Centered Self-Management Empowerment Intervention

The occupational therapist included the patient-centered self-management empowerment intervention (Chen et al., 2018) for Michelle, which was designed to improve her self-efficacy regarding stroke knowledge and management, as well as ADL skills, through five individual sessions, one group session, and phone-call follow-up. The individual sessions were held bedside in the morning with Michelle and occurred on for 20 min inpatient Days 3 to 7. These sessions included ADL training, stroke education (e.g., risk factors), self-health monitoring, complication prevention, goal setting, and the creation of action plans regarding stroke management and rehabilitation through discussion and written material. A 60-min group session with six stroke patients was held on Day 7. The group session

Table 5. Occupational Therapy Evaluation Results for Michelle

Assessment	Results
COPM (Law et al., 2019)	Occupation: Performance (range = 1–10), Satisfaction (range = 1–10) Bathing: Performance 2/10, Satisfaction 1/10 Dressing: Performance 2/10, Satisfaction1/10 Toileting and toilet transfer: Performance 2/10, Satisfaction 1/10 Preparing simple meal: Performance 1/10, Satisfaction 1/10 Medication management: Performance 1/10, Satisfaction 1/10
IRF–PAI (Centers for Medicare & Medicaid Services, 2022)	The IRF–PAI is a standardized assessment scored on a scale ranging from 1 to 6 (1 = *dependent,* 2 = *maximal assist,* 3 = *moderate assist,* 4 = *supervision or touching assist,* 5 = *set-up or clean-up assist,* 6 = *independent*). Michelle's self-care scores were as follows: eating = 5, oral hygiene = 5, toileting hygiene = 3, shower or bathe self = 3, upper body dressing = 3, lower body dressing = 2, putting on and taking off footwear = 2.
FUEL (Van Lew et al., 2015)	Michelle can use her right upper extremity as an independent stabilizer as evidenced by her ability to independently place her right upper extremity on the tube of toothpaste while removing the cap with the unaffected left hand and arm.
Clinical assessment	Left upper extremity: WFL Right upper extremity: ▪ PROM: Shoulder flexion, 150°; shoulder external rotation, 35°; elbow, wrist, and hand, full PROM ▪ AROM: Shoulder, elbow, and wrist less than 1/4 range; minimal gross grasp and minimal release; no finger individuation ▪ Sensation: Impaired light touch in hand ▪ Pain: Reported pain is 3 out of 10 pain with shoulder flexion and external rotation at end-range PROM Sitting balance: Good Standing balance: Fair

Note. AROM = active range of motion; COPM = Canadian Occupational Performance Measure; FUEL = Functional Upper Extremity Levels; IRF–PAI = Inpatient Rehabilitation Facility Patient Assessment Instrument; PROM = passive range of motion; WFL = within functional limits.

included watching a 20-min video regarding self-management poststroke, and the remaining 40 min was dedicated to group members sharing their experiences poststroke and the skills learned in their individual sessions (Chen et al., 2018). The occupational therapist collaborated with psychology and nursing professionals to develop these individual sessions and the group session, with speech therapy to assist with Michelle's communication in the group.

Skills Training Before Discharge

The occupational therapist incorporated several individually tailored training sessions for both Michelle and Chloe to increase Michelle's ability to perform ADLs and to reduce Chloe's caregiving burden before discharge (Deyhoul et al., 2020). The occupational therapist collaborated with the physical therapist regarding gait facilitation and with the speech-language pathologist regarding communication. The intervention consisted of four 60-min sessions/day before discharge. The objective of the first 2 days was to provide stroke education and prevention and caregiving strategies for Michelle and Chloe. Stroke education included the following: stroke symptoms; ischemic versus hemorrhagic strokes; risk factors such as hypertension and diabetes; stroke prevention methods such as diet, diabetes, and hypertension monitoring and control; treatment such as AO and CIMT; and stroke complications. Stroke caregiving training for Chloe focused on strategies to increase performance of ADLs and IADLs through lectures, skills training (e.g., transfers, bathing, one-handed dressing strategies, adaptive meal prep equipment), educational slide shows, discussions, and questions. The objective of the third day was to increase self-efficacy through problem-solving therapy training. This included techniques to cope with problems caused by the stroke by identifying a problem, generating solution alternatives, analyzing the solutions, implementing one, and evaluating the results. On the fourth day, Chloe was provided with stroke education handouts and stroke patient care booklets, and competence was assessed by having her provide a verbal summary of the information and training content to Jasmine, their daughter. Even though Chloe demonstrated competence with the stroke education material, Jasmine was asked to remind Chloe about the stroke topics in the first week after discharge at home. In addition, weekly phone calls from one of the rehabilitation team members were provided for 2 mo to address home safety and fall prevention (Deyhoul et al., 2020).

Outcomes

Table 6 summarizes Michelle's results on discharge outcome measures.

- Michelle attended all occupational therapy sessions and was consistent with her evening

Table 6. Occupational Therapy Discharge Results for Michelle

Assessment	Results
COPM (Law et al., 2019)	Occupation: Performance (range = 1–10), Satisfaction (range = 1–10) Bathing: Performance 6/10, Satisfaction 6/10 Dressing: Performance 7/10, Satisfaction 6/10 Toileting and toilet transfer: Performance 7/10, Satisfaction 7/10 Preparing simple meal: Performance 5/10, Satisfaction 5/10 Medication management: Performance 7/10, Satisfaction 7/10
IRF–PAI (Centers for Medicare & Medicaid Services, 2022)	The IRF–PAI is a standardized assessment scored on a scale ranging from 1 to 6 (1 = *dependent,* 2 = *maximal assist,* 3 = *moderate assist,* 4 = *supervision or touching assist,* 5 = *set-up or clean-up assist,* 6 = *independent*). Michelle's self-care scores were as follows: eating = 6, oral hygiene = 6, toileting hygiene = 6, shower or bathe self = 5, upper body dressing = 6, lower body dressing = 6, putting on and taking off footwear = 6.
FUEL (Van Lew et al., 2015)	Michelle can use her right upper extremity as a gross assist as evidenced by her ability to hold the tube of toothpaste with the affected hand and squeeze toothpaste on the toothbrush.
Clinical assessment	Left upper extremity: WFL Right upper extremity: ▪ PROM: Shoulder flexion, 170°; shoulder external rotation, 40°; elbow, wrist, and hand, full PROM ▪ AROM: Shoulder and wrist less than 1/2 range; elbow 3/4 range; gross grasp 3/4 range and minimal release; no finger individuation ▪ Sensation: Impaired light touch in hand ▪ Pain: Reported pain is 0 out of 10 pain with shoulder flexion and external rotation at end-range PROM Sitting balance: Good Standing balance: Good

Note. AROM = active range of motion; COPM = Canadian Occupational Performance Measure; FUEL = Functional Upper Extremity Levels; IRF–PAI = Inpatient Rehabilitation Facility Patient Assessment Instrument; PROM = passive range of motion; WFL = within functional limits.

exercise program, including AO, task practice, and SR–mCIMT.

- Michelle improved on all outcome measures and met her goals. She improved in feeding, grooming, dressing, toileting, and bathing with adaptive equipment and one-handed techniques.
- Michelle continues to require supervision for bathing while seated in a shower chair for safety.
- Michelle is able to use her affected upper extremity as a gross assist during functional tasks, such grasping a soda can with her affected hand and opening it with her unaffected hand. However, she continues to have difficulty with opening her affected hand and finger individuation.
- Michelle is able to independently manage her medication using a medication sorter and reminder alarms set on her smartphone.
- Michelle requires minimal assistance for simple meal preparation, such as managing tight containers and cutting vegetables.
- Michelle reported feeling more confident in her ability to go home and is looking forward to returning to work in the near future because she was able to tolerate 3 hr of therapy a day plus additional hours in the evening while participating in homework given by all the therapists.
- Chloe reported that she was happy with the home discharge plan for Michelle, although she was anxious about her ability to cope with many facets of her life now, which included care of Michelle. However, she reported feeling more confident with helping Michelle as needed and addressing problems as they came up at home using the problem-solving methods that she learned from the occupational therapist. They both reported wanting some home care assistance and occupational and physical therapy home health visits.
- Chloe stated that she would continue to use the stress management techniques she learned and would follow the recommendations of the occupational therapy practitioner to participate in the caregiver stroke support group and seek treatment from a social worker or psychologist for further cognitive–behavioral therapy strategies to address anxiety.
- Michelle was discharged home with a shower chair and grab bars for the bath and shower and

will use her commode over the toilet and at bedside as needed. Michelle will receive home care 2×/wk for 3 hr for IADLs, home management, and community reentry.

Case Study 2: James

Occupational Profile

James is a 70-yr-old man who experienced a right middle cerebral artery (MCA) occlusion ischemic stroke 18 mo ago. James was hospitalized and then progressed to inpatient rehabilitation for 3 wk before returning home under the care of his wife, Juanita. James completed 19 sessions of outpatient occupational therapy and physical therapy to address weakness on his left side and functional mobility. His last session was about 1 yr ago, and he was recently referred by his neurologist for additional occupational and physical therapy in a community-based setting. Over the past year, James has returned to some of his valued occupations, such as gardening (modified) and watching high school and college sports on television. James continues to struggle with a few daily tasks, such as showering and bathing and meal preparation. He reports that he "feels stuck and a burden" because he is reliant on Juanita and other family members to drive him and assist him with daily tasks. James and Juanita live in a small rural town and have been very active in their local community since their children were small. He has experienced two falls, early after his discharge home; neither were injurious. Since then, he has been extremely cautious. James has stopped attending local games because of his slower walking speed and difficulty navigating stadium bleachers with his straight cane. He states that he spends about 3 hr/week in social activities, most of which are coordinated by Juanita. James, Juanita, and their extended family have planned a summer trip to a large theme park, and James is concerned about his ability to tolerate the long days at the theme park on foot. Juanita says James complains of being tired after 15 min of moderate activity.

Occupational Therapy Initial Evaluation and Findings

On the basis of James's primary complaints of reduced social interactions as a result of his functional mobility and feeling like a burden because of his difficulties performing ADLs and IADLs, the occupational therapist administered the COPM (Law et al., 2019) to further develop an occupational profile. Additionally, the occupational therapist had James perform some of the identified areas of the COPM while Juanita videorecorded and rated his performance using the Performance Quality Rating System (PQRS; Martini et al., 2015). The occupational therapist screened James for cognitive and visual deficits that might affect his ability to drive using basic visuomotor screening (Gillen & Hreha, 2021), the Snellen eye chart (Hetherington, 1954), and the Montreal Cognitive Assessment (Nasreddine et al., 2005). These findings were included in a referral to a local driving rehabilitation center that has a certified driver rehabilitation specialist (CDRS®) on staff. The physical therapist in the outpatient clinic administered and reported the results of the 6-Minute Walk Test (Dunn et al., 2015). The occupational therapist also asked Juanita to complete the Caregiver Self-Assessment Questionnaire (Epstein-Lubow et al., 2010) to determine whether she should be further evaluated for any significant levels of burden, depression, and burnout. Last, the occupational therapist asked Juanita and James to complete the Safe at Home Checklist (Rebuilding Together, n.d.) to identify any potential environmental safety hazards. Table 7 summarizes the results of James's initial assessment.

No home safety hazards were identified. The driving evaluation found no cognitive or visual deficits that affected James's ability to drive. However, slow reaction time resulting from anxiety affected his performance. The CDRS recommended participation in a driving rehab program using a driving simulator and training with a spinner knob for one-handed driving given James's limited left upper extremity active range of motion. The physical therapist reported that the results of the 6-Minute Walk Test showed that James was significantly impaired in walking speed and endurance (350 m or 382 yd with one 30-s seated rest break using his straight cane). James reported low confidence in his community mobility because of fatigue. Juanita reported caregiver strain and burnout and revealed that she struggles with finding time alone because James is at home most of the day.

On the basis of James's assessment results, the occupational therapist, James, and Juanita developed the following long-term treatment goals:

- James will shower independently by discharge, managing all parts of the shower, including the showerhead and bath products.
- James will drive himself in his own car between home and known local destinations (e.g., grocery store, high school) by discharge.
- James will increase time spent in valued social activities by 25% at 3 mo and by 50% at 9 mo.
- James and Juanita will identify and implement three strategies for Juanita to increase the percentage of time spent alone and mentally unburdened from her caregiving role by 9 mo.
- James will increase his confidence in functional mobility in unfamiliar environments and identify and implement strategies to decrease fatigue during community mobility by discharge.

Occupational Therapy Interventions

James participated in occupational therapy in a multidisciplinary center with a specialty in neurological disorders. He initially attended therapy 5×/wk for 2 wk and then 2×/wk for 6 wk. The occupational therapist recommended a constraint-induced therapy (CIT; task-oriented) approach to the intervention for

Table 7. Occupational Therapy Evaluation Results for James

Assessment	Results
COPM (Law et al., 2019) and PQRS (Martini et al., 2015)	Managing showerhead and cleaning products during shower: COPM Performance, 2/10; COPM Satisfaction, 1/10; PQRS, 2/10 Flipping burgers and picking up hot dogs on the grill: COPM Performance, 3/10; COPM Satisfaction, 1/10; PQRS, 3/10 Driving self to high school sports and local hardware store for gardening supplies: COPM Performance, 1/10; COPM Satisfaction, 1/10; PQRS, not rated Functional mobility in unfamiliar environments and uneven terrain: COPM Performance, 4/10; COPM Satisfaction, 4; PQRS, 2/10 Attending local high school sports and interacting with friends: COPM Performance, 4/10; COPM Satisfaction, 2/10; PQRS, not rated
Cognitive screen: MoCA (Nasreddine et al., 2005)	28/30 points (missed 2 delayed-recall items but was able to remember with a category cue)
Visual screen: Visual acuity (Snellen eye chart; Hetherington, 1954), peripheral vision, oculomotor	Visual acuity: 20/20 Peripheral vision: Normal Oculomotor: ▪ Smooth pursuits—Normal ▪ Saccades—Normal ▪ Gaze stabilization—Normal ▪ Convergence—Normal
AROM screen	Cervical: WFL Right upper extremity: WNL Left upper extremity: ▪ Shoulder: 90° in all directions ▪ Elbow: WFL, hypertonic ▪ Wrist: 30° flexion, 10° extension ▪ Hand: flexion, WFL (hypertonic); very limited extension due to tone
Modified Ashworth Scale (spasticity; Bohannon & Smith, 1987)	Shoulder flexors: 0/4 Elbow flexors: 1+/4 Wrist flexors: 2/4 Finger flexors: 2/4
Caregiver Self-Assessment Questionnaire (Epstein-Lubow et al., 2010)	Total score: 13/16 Current level of stress: 7/10 Current health compared with last year: 4/10

Note. AROM = active range of motion; COPM = Canadian Occupational Performance Measure; MoCA = Montreal Cognitive Assessment; PQRS = Performance Quality Rating Scale; WFL = within functional limits; WNL = within normal limits.

the first 2 wk. After the CIT protocol and the evidence supporting it were explained to them, James and Juanita agreed to try it. During the follow-along phase of CIT in the latter 6 wk, James attended group-based cognitive–behavioral therapy (CBT) paired with task-oriented training for balance and functional mobility led by an occupational therapy assistant and a licensed physical therapy assistant. James's occupational therapist was not a CDRS, so he was referred to a local driving rehabilitation center. Juanita attended most outpatient sessions with James, and the occupational therapist integrated CBT methods and a problem-solving approach for both James and Juanita into the sessions. Last, the occupational therapist recommended that Juanita attend the local stroke support group and connected her with a clinical psychologist who specialized in CBT methods.

Constraint-Induced Therapy

After reviewing the ADL and IADL evigraphs (Figures 1–2), the occupational therapist, in collaboration with James and Juanita, selected a CIT approach to address James's concerns with being able to cook and grill for his family and manage all components of taking a shower (Lin et al., 2009; Liu et al., 2016). The occupational therapy practitioner followed the dosing in Liu et al. (2016) and Lin et al. (2009), scheduling 1-hr sessions 5 days/wk for 2 wk. James wore a mitt on his right hand during the in-clinic sessions and for up to 4 hr per day. He recorded his performance of several daily tasks on his homework sheet and committed to intensive individual practice and problem solving for up to 2 additional hr/day. The occupational therapist completed an activity analysis of showering and grilling (based on PQRS ratings of videos) and used the findings to tailor the shaping tasks for James. For example, James had difficulty with supination while using the heavy grill spatula to flip hamburgers. For a shaping task, James started with the task of sliding his hand under the page of a board book to turn it. He progressed to turning over playing cards and then pancakes using a light spatula. The occupational

therapist also integrated problem solving into the sessions to provide James with strategies to use in other areas of occupational performance. Specifically, the occupational therapist taught James to use the self-regulation strategy to self-identify problems and solutions and practice adapted tasks. For example, James would often become frustrated when he was unable to open various bottles during his shower. Using a self-regulation strategy, James was able to identify that his current approach to opening a bottle of shampoo was not working and to try a different strategy. If the new strategy did not work, he would be able to reflect on what was different, what worked and what did not, and try something different.

Group-Based Cognitive–Behavioral Therapy and Task-Oriented Training

Starting in Wk 3, James attended a group class 2×/wk for 6 wk via videoconferencing (T. W. Liu et al., 2019). The group was co-led by an occupational therapy assistant trained in CBT techniques and a physical therapy assistant. Each class was 90 min long. The first half of the class was led by the occupational therapy assistant and focused on CBT with the purpose of improving balance self-efficacy. The two main strategies were cognitive restructuring and behavior modification. Cognitive restructuring has four steps, including identification of automatic thoughts. This addresses maladaptive thoughts that can influence a person's balance performance. Behavior modification strategies include helping participants identify potential risks and develop behavioral strategies to help them increase their activity levels. James discovered that he was somewhat fearful of walking alone because he was often scolded by nursing staff in inpatient rehabilitation whenever he tried to get up and walk on his own. He developed a new mantra, "my legs are strong," and set a timer on his phone to prompt him to get up every hour and take a walk. The second half of the class was led by the physical therapy assistant and included strengthening and balance exercises in addition to task practice. All exercises and tasks were customized for individual participants and group discussion, and participants were encouraged to reassure one another. For James, there was an additional focus on endurance during balance exercises and strengthening.

Driving Rehabilitation

James attended driving rehabilitation at a local center that had a driving simulator for both testing and driving training (Devos et al., 2009). The system included a life-sized car and surround screens. Scenarios and difficulty settings could be programmed by the occupational therapist, who was a CDRS. James began driving rehabilitation in Wk 3, attending a 1-hr session, 1×/wk, for 8 wk. The CDRS focused on improving James's confidence behind the wheel, gradually increasing the complexity of driving scenarios and challenging his reaction time. James has weakness on the left side, so the occupational therapist trained James in using a spinner knob attached to the steering wheel. The occupational therapist also included training in the other components of driving, such as starting the car, shifting, and fastening a seatbelt with hemiparesis.

Caregiver: Cognitive–Behavioral Techniques and Problem Solving

At the recommendation of James's usual occupational therapy practitioner, Juanita began attending the local caregiver stroke support group that met once a month via videoconference. The occupational therapy practitioner also continued to use problem-solving training with Juanita via phone calls. The sessions focused on giving her the strategies to define problems, brainstorm solutions, try solutions, and then reflect on how the solution worked (Pfeiffer et al., 2014). Juanita identified a thought pattern similar to James's, in that she felt anxious leaving him alone, which contributed to burnout. Juanita and the occupational therapist brainstormed a few solutions, such as reframing her anxious thought with a positive one and practicing breathing techniques to calm her anxiety. Juanita also decided that she and James would keep their cell phones with them at all times in case of an emergency. Juanita scheduled an appointment with a clinical psychologist for additional therapy to address her anxiety and depression related to caregiving.

Outcomes

At the end of 8 wk of outpatient rehabilitation, James met several of his goals. James can shower independently, reducing the burden on Juanita. James and Juanita have had several conversations about Juanita's caregiver role and worked together to restructure the guest bedroom in their house to be a quiet space for Juanita to do yoga, sew, and have alone time. Additionally, James's confidence in his ability to walk outside has increased, and he now walks with a friend to the town diner three times a week. This gives Juanita time alone in the house. Because of her problem-solving training, Juanita has noticed that she is more confident in her ability to cope with future problems and worries less about James's safety. She also practices strategies to reframe her anxious thoughts and to calm herself with relaxation techniques. James and Juanita have started taking their elementary-age grandchildren to a local farm to pick fruit and to fish in a pond to further increase James's confidence in his mobility on uneven surfaces, such as his garden, and to increase his activity tolerance. James plans to plant a small salad garden next spring. He has started implementing strategies from CIT into meal preparation in the kitchen and using the grill. He still requires some assistance with flipping hamburgers because of tone in his left forearm, limiting supination; however, he

reports that he finds the tasks more enjoyable and even agreed to help serve hot dogs at the local high school sports department fundraiser. James has attended two of the past five high school football games and plans to attend some basketball games in the coming season. James is still in driving rehabilitation and plans to take his driving test in 2 mo. He has been practicing driving on short, simple routes with his CDRS. Table 8 summarizes James's results on discharge outcome measures.

Strengths and Limitations of the Current Body of Evidence

The current body of evidence has strengths and limitations related to the systematic reviews that informed these practice guidelines. Systematic reviews address specific clinical questions that are guided by an a priori protocol for the question development and review process. No systematic review can address all aspects of a topic; the authors decide what to address before conducting the review. Additionally, no review is perfect, and even the most careful searches sometimes miss articles. The way to reduce these potential sources of bias is to conduct the review using best-practice methodology (see the Appendix).

Strengths

At every step of the process, the review authors followed best-practice methodology to the best of their ability, including getting input at all stages from practitioners, researchers, consumers, and experts in the areas included in the reviews. The clinical recommendations are based on findings from the systematic reviews. It is worth noting that the systematic reviews on which these practice guidelines are based include available research published since the previous reviews (2012–2019), or, in the case of the question regarding caregivers of people with stroke, an even greater period of time because this question had not been addressed in the previous reviews (i.e., 1999–2019). The review questions for the systematic reviews were developed with an intentional focus on occupation-based outcomes. Improvement in these outcomes is the goal of occupational therapy, so the systematic reviews targeted studies reporting occupation-based interventions and outcomes. Additionally, the guidelines provide materials to help practitioners see how the research findings might be translated to the practice setting.

The stroke intervention literature is relatively abundant in the areas of research on ADLs and caregivers of people with stroke. The systematic review for ADL outcomes found numerous and disparate interventions that have a strong level of evidence to improve performance. However, many of these interventions, such as mirror therapy or preparatory methods, are not occupation based. The literature on interventions for caregivers of people with stroke is also rich and has strong evidence, even though the outcome measures are typically impairment based. Although the number of interventions for IADLs and social participation are more limited and, in the case of social participation, have a lower level of evidence, the systematic reviews for IADLs and social participation of the stroke survivor identified important research that will be beneficial in guiding occupational therapy intervention and future research.

Limitations: Gaps in the Evidence

Gaps in knowledge exist when the information in the literature about an intervention is insufficient, imprecise, inconsistent, or biased (Robinson et al., 2011). Gaps also exist when the literature is not sufficient to answer a clinical question.

Lack of research supporting specific interventions does not mean practitioners should not use those interventions. When providing occupational therapy services to clients, practitioners considering specific interventions when there is not enough evidence to support evidence-based practice should use expert knowledge and their own training and experience to guide practice. In this section, we pinpoint important

Table 8. Occupational Therapy Discharge Results for James

Assessment	Results
COPM (Law et al., 2019) and PQRS (Martini et al., 2015)	Managing showerhead and bath products during shower: COPM Performance, 9/10; COPM Satisfaction, 10/10; PQRS, 8/10 Flipping burgers and picking up hot dogs on the grill: COPM Performance, 7/10; COPM Satisfaction, 5/10; PQRS, 6/10 Driving self to high school sports and local hardware store for gardening supplies: COPM Performance, 5/10; COPM Satisfaction, 5/10; PQRS, not rated Functional mobility in unfamiliar environments and uneven terrain: COPM Performance, 7/10; COPM Satisfaction, 4/10; PQRS, 7/10 Attending local high school sports and interacting with friends: COPM Performance, 8/10; COPM Satisfaction, 8/10; PQRS, not rated
Caregiver Self-Assessment Questionnaire (Epstein-Lubow et al., 2010)	Total score: 6/16 Current level of stress: 2/10 Current health compared with last year: 4/10

Note. COPM = Canadian Occupational Performance Measure; PQRS = Performance Quality Rating Scale.

gaps in evidence for interventions and approaches practitioners may consider using, as appropriate.

Occupational therapy practitioners need to think about the elements of evidence-based practice as they evaluate these guidelines, considering gaps in the literature related to their clinical practice. Practitioners should consider the following questions when they identify these gaps (Gutenbrunner & Nugraha, 2020):

1. What evidence exists?
   - What are the best practices associated with providing services to this client population?
   - What interventions are contraindicated for this population?
   - What outcomes am I hoping to achieve with this client?
   - Does evidence exist in another field or discipline related to interventions and desired outcomes that are within the scope of occupational therapy practice?
2. What are my client's preferences and values?
   - Does my client prefer one intervention over another?
   - Are available resources, cost, or time influencing my client's preference?
   - How might the intervention I am considering affect my client's performance patterns and roles?
   - Does my client find the intervention I am considering meaningful?
3. What experience and expertise do I have that can help guide my decisions?
   - What types of interventions have I used previously that were effective with similar clients or populations?
   - What types of interventions have I used previously that were ineffective with similar clients or populations?
   - What potential risks does the intervention I am considering pose to my client or this client population?
4. Will the health care system or organization be supportive of this intervention?
   - How will I document this intervention?
   - How will I document the outcomes associated with this intervention?
   - Is it likely that this intervention will be reimbursed?

The following sections present additional information and common occupational therapy interventions for people with stroke that are not addressed in these guidelines because of a lack of current relevant evidence. These sections are based on existing or emerging evidence, expert opinion, or both.

Gaps in the Literature

Gaps in stroke rehabilitation research with respect to the role of occupational therapy can be attributed to several factors. Some topics have minimal research or lower level evidence (e.g., Level 3b), whereas other topics have stronger evidence (e.g., Level 1b) but only within a specific substroke population. Additional gaps include a lack of research participant diversity, limited use of participation as a primary outcome measure, and a focus on changes in impairment rather than changes in occupational performance. Despite these gaps, occupational therapy practitioners should continue to use comprehensive, client-centered, and functional assessments and interventions and are urged to collaborate with researchers to provide evidence for these important topics.

Occupation-Based Methods

The core of occupational therapy is the therapeutic use of everyday occupations (e.g., ADLs, IADLs, leisure, work) for the purpose of increasing occupational performance, life participation, and quality of life (AOTA, 2020). Thus, it is imperative that occupational therapy practitioners use occupations to evaluate and treat clients poststroke. Legg et al. (2017) performed a systematic review and meta-analysis that showed significant improvements in ADL outcomes through ADL training, whether it be through remediation, adaptation, or assistive technology; however, these studies took place only in the home care setting. Future research is needed to assess occupation-based interventions, such as those targeting ADLs, IADLs, work, and leisure, in other settings such as inpatient, outpatient, and acute care. Furthermore, we encourage occupational therapy practitioners to focus on occupation-based interventions and document those interventions that lead to successful ADL outcomes to further validate the importance of occupation-based interventions and strengthen the occupational therapy profession.

Stroke Research With Diverse Groups

Black, Hispanic, and Indigenous Americans have a higher incidence of stroke than non-Hispanic White or Asian Americans, and women have a higher lifetime risk of stroke than men (Tsao et al., 2022). Racial disparities, gender, and socioeconomic status have been shown to lead to poorer stroke outcomes because of poorer access to good-quality stroke care (Ikeme et al., 2022; Marshall et al., 2015). Studies generally did not examine stroke intervention's effectiveness with people of different races, ethnicities, genders, and socioeconomic status. This disparity in effective stroke intervention should be addressed in future research. In practice, occupational therapy practitioners must consider the unique social determinants of health that affect clients' stroke risks and outcomes and take care to perform client-centered evaluations and interventions.

Participation Outcome Measures

As a construct, social participation was generally assessed through a component of a broader assessment tool, such as the 36-item Short Form Survey (SF–36; Hays et al., 1993) or the Stroke Impact Scale (Mulder

& Nijland, 2016). Additionally, most assessment tools that include questions related to social participation have a narrow and limited scope. Social participation is multifaceted and includes physical abilities as well as emotional and social considerations; thus, changes in a client's participation in everyday social activities do not occur rapidly (Tipnis et al., 2023). Occupational therapists are encouraged to assess the social participation of each client who has had a stroke and to consider using more robust measures of social participation, such as the PROMIS® Social Function measures (Cella et al., 2010) or the Assessment of Life Habits (Fougeyrollas et al., 2002). Future research should consider a focus on social participation as a primary outcome and design studies that include appropriate time scales for assessment (≥1 yr pre–post).

Similarly, few stroke caregiver studies included outcome measures of the caregivers' occupational performance or participation. Most caregiver intervention outcomes were impairment based and measured self-reported burden, strain, or coping (e.g., Caregiving Burden Scale; Elmstahl et al., 1996); depression or anxiety (e.g., Center for Epidemiological Studies–Depression scale (Radloff, 1977); or quality of life (e.g., SF–36; Rand Corporation). A few studies measured caregivers' knowledge of care techniques and their performance of caregiving skills. For example, Mant et al. (2000, 2005) included the Frenchay Activities Index (Schuling et al., 1993) to determine how the intervention affected caregivers' social activity level. Given the large number of caregivers of people with stroke, their significance as a stroke team member, and the effect of caregiver performance on the stroke patient's outcomes, practitioners must consider caregivers' occupational performance and participation in addition to their caregiving capabilities. Future research should also include outcome measures that determine whether caregiver interventions improve performance and participation in caregiving skills and in caregivers' valued occupations.

Modifiable Risk Factors: Health Promotion and Prevention

The *OTPF–4* (AOTA, 2020) designates health management as an occupation within the domain of practice and defines aspects that should be addressed in intervention, such as social and emotional health promotion, communication with health care providers; physical activity; and management of symptoms, conditions, medications, nutrition, and personal care devices. Occupational therapy practitioners should collaborate with interprofessional teams to assess and treat these components of health management in people with stroke to prevent another stroke, to prevent disabilities or complications resulting from stroke, and to support participation in other occupations (AOTA, 2020; Tsao et al., 2022). Researchers should also consider investigating the efficacy of health promotion and prevention interventions for the performance of the occupations that make up health management.

Visuospatial and Neurobehavioral Impairments Related to ADLs, IADLs, and Social Participation

Occupational therapy practitioners should address stroke clients' visuospatial (e.g., hemianopsia, diplopia) and neurobehavioral impairments (e.g., ideational apraxia, motor apraxia, neglect) because these impairments can negatively affect occupations, occupational performance, and quality of life (Gillen & Hreha, 2021). They should perform a comprehensive assessment of the client's abilities, limitations, and functional goals and implement a comprehensive client-centered treatment plan. The minimal research in this area has shown improvements, but findings are limited to gains at the impairment level or consist of low-level research related to ADL outcomes (Gillen, 2009; Gillen & Hreha, 2021). Thus, higher levels of research are needed to address visuospatial and neurobehavioral interventions to improve occupational performance in ADLs, IADLs, leisure, and work.

Additional Implications for Occupational Therapy

To complement the clinical recommendations provided in Tables 1 to 4, the sections that follow describe general implications for occupational therapy with people with stroke and their care partners, based on stroke-related evidence and best-practice occupational therapy principles.

Occupation-Based Assessment and Intervention

Occupational therapy practitioners and researchers should focus on occupation-based rather than impairment-based assessments and interventions. Occupation-based intervention can be integrated into stroke rehabilitation in two ways: occupation as ends or occupation as means. *Occupation as ends* refers to tasks or activities that a client needs to or wants to perform, for example, practicing dressing so that the client will be able to dress in the morning before work. *Occupation as means* refers to using occupations to improve client factors or performance skills, such as using the Nintendo Wii to improve eye–hand coordination or hand strength. Occupations are the hallmark of the occupational therapy profession and should be the focus of occupational therapy practitioners and researchers.

Interventions That Clients Perform Outside of Therapy Sessions

For individuals poststroke, the context of activity and repetition are important to recovery, specifically to promote neuroplastic changes (Hara, 2015; Rahayu et al., 2020; Singh et al., 2021), making it critical for occupational therapy practitioners to train clients in therapeutic interventions, such as AO, mirror therapy, or CIT, that can be performed independently outside of formal therapy sessions (i.e., in the home or in the evening in the rehabilitation hospital). These

approaches are low cost and easy to administer, provide opportunities for increased practice and neuroplastic changes, and subsequently lead to increased occupational performance.

Remote Service Delivery Models

Interventions performed by telephone or telephone follow-up after discharge were found to have strong or moderate evidence for improving ADLs (Chen et al., 2018; Sit et al., 2016), IADLs (Sit et al., 2016), and social participation (Geng et al., 2019) of people with stroke. Telephone interventions were widely used with caregivers of people with stroke. Much research found strong and moderate levels of evidence for providing telephone interventions and follow-up postdischarge in CBT and problem-solving training, education, and support to caregivers (Bishop et al., 2014; Cheng et al., 2018; Deyhoul et al., 2020; Hartke & King, 2003; King et al., 2012; Kuo et al., 2016; Lincoln et al., 2003; Mant et al., 2000; Perrin et al., 2010; Pfeiffer et al., 2014; Shyu et al., 2008). Occupational therapy practitioners should consider offering interventions that would be appropriate to deliver remotely, such as education or support. This may ease the burden and stress caused by in-person therapy sessions for both the person with stroke who may have multiple impairments and the caregiver who has limited time and energy.

Caregiving as a Co-Occupation

Not only is the caregiver an important stroke team member, but they should also be considered as clients and, consequently, should be a focus of interventions for performing caregiving tasks and maintaining their own occupational participation and quality of life (AOTA, 2020). Research has shown that caregivers who are physically and emotionally well provide better care, resulting in better outcomes for the care recipient who has had a stroke (Bakas et al., 2014). However, studies have found that the time therapists spend with caregivers of people with stroke is short, and the topics addressed are limited (Lawson et al., 2015). Occupational therapy practitioners should be familiar with a variety of caregiver assessments and follow the recommendations for best practice in interventions for caregivers in these Practice Guidelines.

Psychotherapeutic Interventions

CBT, problem-solving therapy, self-management techniques, and empowerment coaching were found to be effective tools in improving ADLs and IADLs in people with stroke and in improving caregivers' quality of life and ability to perform caregiving tasks (Grant et al., 2002; T. W. Liu et al., 2019; Pfeiffer et al., 2014; Sit et al., 2016; Wang et al., 2018). As with any unfamiliar technique, occupational therapy practitioners should consider seeking additional training to implement them skillfully.

Summary

These Practice Guidelines summarize the current evidence to inform occupational therapy practitioners' clinical decision making when collaborating on interventions with clients with stroke, their caregivers, and interdisciplinary team members. Included are evidence-based interventions to address occupational performance in ADLs, IADLs, and social participation for clients who have had a stroke and interventions for their caregivers to maintain the caregiving role. On the basis of the findings of the systematic reviews, occupational therapy practitioners have many choices of evidence-based interventions to offer their clients with stroke and their caregivers and on which to collaborate with interprofessional team members. These Practice Guidelines also provide two practical case examples and evigraphs to guide evidence-based decision making and intervention planning. Although much research was found, particularly with respect to ADLs, the Practice Guidelines identify gaps in the research that are based on expert opinion and the evidence.

Occupational therapy practitioners have an integral role to play in all practice settings in which people with stroke are treated, from acute care to community programming. They are unique members of the rehabilitation team because of their holistic consideration of the many factors that influence occupational performance and participation. Practitioners should use the evidence in these Practice Guidelines, along with their professional experience and reasoning and the preferences of the client and family. Delivering evidence-based and innovative care to people with stroke and their caregivers in traditional and nontraditional settings is challenging, but the profession must continue to evolve, with practitioners implementing best practice as evidence changes and advances, to ensure that occupational therapy educational programs prepare future practitioners for best practice, and to grow a body of research grounded in occupation.

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Appendix: Overview of the Systematic Review Methods and Findings

The systematic reviews completed for these Practice Guidelines were conducted according to the Cochrane Collaboration methodology (Higgins et al., 2019) and are reported in a manner consistent with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (Moher et al., 2009).

Review Questions

1. What is the evidence for the effectiveness of interventions within the scope of occupational therapy practice to improve performance and participation in activities of daily living (ADLs) for adult stroke survivors?
2. What is the evidence for the effectiveness of interventions within the scope of occupational therapy practice to improve performance and participation in instrumental activities of daily living (IADLs) among adult stroke survivors?
3. What is the evidence for the effectiveness of interventions within the scope of occupational therapy practice to improve the performance of and participation in education, work, volunteering, leisure, and on social participation among adult stroke survivors?
4. What is the evidence for the effectiveness of interventions within the scope of occupational therapy practice for caregivers of people who have had a stroke that facilitate maintaining participation in the caregiver role?

Inclusion and Exclusion Criteria, Databases Searched, and Search Terms

Table A.1 summarizes the search strategies for these systematic reviews. Inclusion criteria were as follows:

- Peer-reviewed journal articles
- Publication in English (unless review authors were able to translate)
- Publication dates as follows: Question 1, January 1, 2012–December 31, 2019; Questions 2–3, January 1, 2009–December 31, 2019; Question 4, January 1, 1999–December 31, 2019
- Levels 1a, 1b, 2a, 2b, and 3a evidence, and Level 3b evidence if no higher-level studies are available (see "Levels of Evidence" section)
- Interventions within the scope of occupational therapy practice
- Participants who were adults ages >18 yr
- Participants after stroke, as well as caregivers of adults with stroke.

Exclusion criteria were as follows:

- Dissertations, theses, presentations, and proceedings
- Published outside the date range of the reviews
- Level 4 or 5 evidence
- Interventions outside of scope of occupational therapy practice
- Average age of participants <18 yr.

The following databases were searched:

- MEDLINE
- PsycINFO
- CINAHL
- OTseeker
- Cochrane databases
- Hand search as needed.

Levels of Evidence

Each article evaluated in the reviews was assigned a level of evidence using the Oxford Centre for Evidence-Based Medicine (2009) framework:

- Level 1a: Systematic review of homogeneous randomized controlled trials (RCTs; e.g., similar population, intervention) with or without meta-analysis
- Level 1b: Well-designed individual RCT (not a pilot or feasibility study with a small sample size)
- Level 2a: Systematic review of cohort studies
- Level 2b: Individual prospective cohort study, low-quality RCT (e.g., <80% follow-up or low number of participants, pilot or feasibility

Table A.1. Search Strategy for Systematic Review Questions

Category	Key Search Terms
Diagnosis and conditions	stroke, cerebrovascular accident, cerebrovascular disorders, hemiparesis, hemiplegia
Study and trial designs	best practices, case control, case report, case series, clinical guidelines, clinical trial, cohort, comparative study, controlled clinical trial, cross over, cross-sectional, double-blind, evaluation study, evidence-based, evidence synthesis, feasibility study, follow-up, intervention, longitudinal, main outcome measure, meta-analysis, multicenter study, observational study, outcome and process assessment, practice guidelines, prospective, random allocation, randomized controlled trials, single subject design, standard of care, systematic literature review, systematic review, treatment outcome
All questions	activities, adaptation, agnosia, ambulation, anosognosia, anxiety, aphasia, apraxia, arm, assistive devices, assistive equipment, assistive technology, attention, awareness, balance, behavioral activation, bilateral training, biofeedback, body neglect, cognition, cognitive behavioral therapy, cognitive rehabilitation, cognitive reorganization, cognitive retraining, cognitive retraining model, communication, communication technology, community care, community programs, constraint induced movement therapy, contracture, depression, disease management, dual tasking, dysexecutive syndrome, education, EMG, emotional regulation, energy conservation, edema, environment, environmental modification, errorless learning, executive function, exercise, fall prevention, falls, fatigue, field cut, forced use, functional activities, functional electrical stimulation, gait, goal management, gravity loading, hand, health care utilization, health literacy, health maintenance, health promotion, hemianopsia, home health, home modifications, inattention, insight, intellectual function, intensity, judgment, kinematics, learning, leisure, lifts, lower extremity, lower limb, massed practice, memory, mental practice, metacognitive training/instruction, mindfulness, mirror therapy, mobility, mobility equipment, motivational interviewing, motor, motor behavior, motor control, motor learning, motor recovery, multicontext approach, multi-tasking, neurofunctional approach, neurorehabilitation, nonmotor symptoms, occupational therapy, organization, orientation, orthotics, pain, perception, personal neglect, physical activity, planning, positioning, postural control, practice, problem solving therapy, progressive resistive exercise, psychosocial, quality of life (QOL), quadraphonic approach, recovery, rehabilitation, remediation, repetitive task practice, robot assisted, robotics, scooters, self-management, sequencing, services, sling, social engagement, spasticity, spatial neglect, spatial relations, splinting, strapping, strategy training, strengthening, subluxation, taping, task oriented training, task related practice, task specific practice, telehealth, therapy, time pressure management, training, transfer of training, transfers, treadmill training, treatment, trunk, trunk control, upper limb, upper extremity, upper limb activity, upper limb capacity, upper limb function, upper limb training, user computer interface, video games, virtual reality, vision, visual motor, visual processing, visuospatial, walkers, weakness, wellness programs, wheelchairs, yoga
Question 1: ADLs, rest and sleep	Activities of daily living, basic activities of daily living, ADL, BADL, adaptive device, bathing, bowel and bladder management, daily living activities, daily living skills, eating, feeding, functional mobility, grooming, hearing aids, incontinence, mobility, mobility aid, oral hygiene, personal care, personal device care, personal healthcare device, personal hygiene, self-care, self-feeding, self-help devices, sexual activity, sexual behavior, sexual education, showering, toilet hygiene, toileting, durable medical equipment, dressing, adaptive equipment, bedtime routine, napping, rest, sleep, sleep hygiene, sleep participation, sleep preparation, relaxation, sleep deprivation, sleep quality, sleep apnea, fatigue, insomnia, sleep medication, transfers, bed mobility
Question 2: IADLs	activity therapy, child care, child rearing, communication skills training, community mobility, computer literacy, cooking, daily activities, driving, electronic security systems, emergency preparation, energy conservation, financial management, financial skills, food preparation, grandparent, grandparenting, home maintenance, home management, home security, household maintenance, household management, household security, housekeeping, IADL, instrumental activities, instrumental activities of daily living, laundry, meal planning, meal preparation, medication management, menu planning, money management, pets, religious service attendance, religious/spiritual activities, routines, safety, self-management, shopping, telephone, transportation, walking, wellness
Question 3: Work, leisure, and social participation	activity participation, adult education, career, civic engagement, civic participation, clubs, community service, computer application, computer tablet, computer tablet technology, computer use, continuing education, crafts, distance education, education, employment, employment interests, employment pursuits, family relations, friends, friendships, games, hobbies, hobby, informal education, interpersonal relations, job, job holder, job search, labor, labor force, leisure, leisure activities, leisure exploration, leisure participation, lifelong learning, mobile application, mobile device, mobile phone, neighbor relations, peer, personal support, phased retirement,

(*Continued*)

Table A.1. Search Strategy for Systematic Review Questions (*Cont.*)

Category	Key Search Terms
	political, productive activities, reading, recreation, relationships, retired senior volunteer program (RSVP), retirement, retirement planning, retirement preparation, return to work, senior center, smartphone use, social activity, social adjustment, social capital, social environment, social interaction, social isolation, socialization, socializing, social participation, social skills, social support, sports, travel, volunteer, volunteer exploration, volunteerism, volunteer participation, volunteer work, wage earner, work, work role, work transition, worker, writing
Question 4: Caregiver burden	caregiver, caregiver appraisal, caregiver burden, caregiver burnout, caregiver confidence, caregiver depression, caregiver education, caregiver participation, caregiver perception, caregiver quality of life, caregivers, caregiver strategies, caregiver stress, caregiver support, caregiver training, caregiver upset, caregiving, care of others, care partner, carer, communication, family caregiver, family member, spouse, informal caregiver, psychoeducation, psychosocial intervention, skill building

Note. ADL = activities of daily living; BADL = basic activities of daily living; EMG = electromyography; IADL = instrumental activities of daily living; Q = question.

study), ecological study, or two-group nonrandomized study
- Level 3a: Systematic review of case–control studies
- Level 3b: Individual retrospective case–control study, one-group nonrandomized pretest–posttest study, or cohort study
- Level 4: Case series (or low-quality cohort or case–control study)
- Level 5: Expert opinion without explicit critical appraisal.

Article Screening and Data Extraction

A medical librarian conducted the searches and removed duplicates; review teams (of at least two authors) independently screened titles and abstracts based on the inclusion criteria. Reviewers resolved any differences by discussion and, if necessary, consultation with a third party (an American Occupational Therapy Association Evidence-Based Program team member) until consensus was reached. The review teams then obtained and reviewed the full-text articles to determine inclusion or exclusion. They extracted data from the included studies in an evidence table that summarized each study's methods, risk-of-bias evaluation, participants, intervention setting, intervention and control conditions, outcome measures, and results.

Quality of the Evidence and Risk of Bias

Two members of the review teams independently assigned quality ratings to each study and collaborated to reach consensus. The review teams evaluated the risk of bias on the basis of study design

Table A.2. Strength of Evidence (Level of Certainty) Designations

Level	Description
Strong	▪ Two or more Level 1a or 1b studies ▪ The available evidence usually includes consistent results from well-designed, well-conducted studies. The findings are strong, and they are unlikely to be strongly called into question by the results of future studies.
Moderate	▪ At least 1 Level 1a or 1b high-quality study or multiple moderate-quality studies (e.g., Level 2a or 2b, Level 3a or 3b). ▪ The available evidence is sufficient to determine the effects on health outcomes, but confidence in the estimate is constrained by such factors as ◦ number, size, or quality of individual studies and ◦ inconsistency of findings across individual studies. ▪ As more information (other research findings) becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion related to the usefulness of the intervention.
Low	▪ Small number of low-level studies, flaws in the studies, etc. ▪ The available evidence is insufficient to assess effects on health and other outcomes of relevance to occupational therapy. Evidence is insufficient because of ◦ limited number or size of studies, ◦ important flaws in study design or methods, ◦ inconsistency of findings across individual studies, and ◦ lack of information on important health outcomes. ▪ More information may allow estimation of effects on health and other outcomes of relevance to occupational therapy.

Table A.3. Number of Articles Included in the Systematic Reviews, by Topic

Review Question Topic	Level of Evidence			Total
	1a	1b	2b	
ADLs	24	42	0	66
IADL	0	9	10	19
Education, work, leisure, volunteering, social participation	0	17	32	49
Caregiver	0	22	12	34
Total	24	90	54	168

Note. None of the studies included in these reviews reported adverse events or harms related to the interventions evaluated. ADLs = activities of daily living; IADLs = instrumental activities of daily living.

(controlled or noncontrolled trial). For studies that included a control group (randomized or nonrandomized), they used the Cochrane tool (Higgins et al., 2016); for noncontrolled trials, they used a tool developed by the National Heart, Lung, and Blood Institute (2014).

Strength of Evidence

Each systematic review team grouped the evidence into themes and determined the strength of the evidence for each theme. The strength-of-evidence designations are outlined in Table A.2 and are based on U.S. Preventive Services Task Force (2018) guidelines. Strength-of-evidence designations are a synthesis of number of studies, level of evidence, quality of evidence (risk of bias), and findings of the studies (e.g., significance). Synthesizing these four elements of the evidence enabled the review authors to determine the level of certainty that the interventions discussed in the articles resulted in the outcomes shown.

Overview of Search Results

The searches located 82,357 citations and abstracts for Questions 1–3 and 2,976 for Question 4. The research methodologist completed the first step of eliminating references on the basis of title, removing duplicates and studies clearly not within the parameters of the review (e.g., date of publication, population, intervention). This step reduced the number of citations to 9,411 (Questions 1–3) and 547 (Question 4), which were given to the review teams.

Teams of two or more reviewers with expertise in the content areas carried out the systematic reviews. The review teams completed the next step of eliminating references on the basis of the abstracts, retrieved the full-text versions of potential articles, and determined final inclusion in the reviews on the basis of the inclusion and exclusion criteria.

A total of 168 studies were included in the systematic reviews—24 Level 1a, 90 Level 1b, and 54 Level 2b studies—and served as the basis for the clinical recommendations. Table A.3 lists the number of articles included in each review and their levels of evidence. (Note that some articles addressed multiple outcomes of interest and are discussed in more than one section of these guidelines.) Citations for the systematic review articles and systematic review briefs are as follows:

Geller, D., Goldberg, C., Winterbottom, L., Nilsen, D. M., Mahoney, D., & Gillen, G. (2023a). Systematic Review Briefs—Task oriented training interventions for adults with stroke to improve ADL and functional mobility performance (2012–2019). *American Journal of Occupational Therapy, 77*(Suppl. 1), 7710393050. https://doi.org/10.5014/ajot.2023.77S10005

Geller, D., Goldberg, C., Winterbottom, L., Nilsen, D. M., Mahoney, D., & Gillen, G. (2023b). Systematic Review Brief—Task-oriented training with cognitive strategies for adults with stroke to improve ADL and/or functional mobility performance (2012–2019). *American Journal of Occupational Therapy, 77*(Suppl. 1), 7710393030. https://doi.org/10.5014/ajot.2022.77S10003

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