The Open Journal of Occupational Therapy

Volume 7
Issue 1 *Winter 2019*

Article 6

January 2019

The Feasibility of Conducting Task-Oriented Training at Home for Patients with Stroke

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Recommended Citation

Rowe, V. T., & Neville, M. (2019). The Feasibility of Conducting Task-Oriented Training at Home for Patients with Stroke. *The Open Journal of Occupational Therapy, 7*(1). https://doi.org/10.15453/2168-6408.1514

The Feasibility of Conducting Task-Oriented Training at Home for Patients with Stroke

Abstract

Background: Task-oriented training for upper extremity hemiparesis following a stroke is an effective intervention with evidence of its application in the clinic setting. However, the home provides an enriched and practical environment to implement this intervention. This report presents the feasibility of implementing task-oriented training at home.

Method: Stroke survivors with limitations in upper extremity movement and function were assessed before and after a Task-Oriented Training and Evaluation at Home (TOTE Home) program, and 1 month later. Areas of process, resources, management, and scientific value were analyzed for the feasibility of a larger randomized clinical trial (RCT).

Results: The process of this study was acceptable but demonstrated a need for more personnel for a larger trial to accommodate a larger sample over a shorter period. Adjusting the amount of intervention dosing may reduce the amount of resources required to achieve participants' goals. A large RCT examining TOTE Home would require management from multiple professionals. TOTE Home proved to be a safe scientific endeavor with no adverse side effects.

Conclusion: The implementation of TOTE Home is a feasible endeavor. A larger clinical trial is justified to determine the generalizability and effectiveness of this intervention in a home-based setting.

Keywords

hemiparesis, rehabilitation, CVA, occupational therapy, occupational adaptation

Cover Page Footnote

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DOI: 10.15453/2168-6408.1514

Task-oriented training (TOT) is based on the principle of experience-dependent neuroplasticity incorporating motor learning theory (Winstein, Lewthwaite, Blanton, Wolf, & Wishart, 2014). Motor learning following a stroke is attributed to neuroplasticity, specifically new neural networks and the recruitment of brain regions not previously used with movement (Kleim & Jones, 2008). The establishment of new neural networks resulting in brain reorganization is referred to as experience-dependent plasticity (Feldman, 2009). A few of the principles of TOT include: a large amount of repetition, tasks that require problem-solving (challenging), task practice in varying contexts (e.g., turning on different faucets, washing different dishes), means of feedback on performance, and a high level of engagement and motivation (Lang & Birkenmeier, 2013). Selecting the tasks for practice is critical to the experience-dependent plasticity.

Studies using functional magnetic resonance imaging (fMRI) have shown that intense repetitive practice is essential to new motor learning and experience-dependent plasticity (Steele & Penhune, 2010). In 2003, Jang and colleagues, using fMRI, found cortical reorganization with TOT. TOT uses the repetitive practice of functional activities to learn, or to relearn, motor behaviors (Waddell, Birkenmeier, Moore, Hornby, & Lang, 2014). During TOT, the participant engages in behavioral experiences that directly replicate the sensorimotor skills needed to complete a task successfully. In addition, this intervention incorporates progressive challenges to a participant's capabilities and involves tasks that are meaningful to the participant (Winstein et al., 2014; Winstein, Wolf, & Schweighofer, 2014).

TOT has impacted hand function and activities of daily living (ADLs) (Yoo & Park, 2015), as well as overall upper extremity function (Park, 2016). TOT programs, including the Accelerated Skill Acquisition Program (ASAP), have been recommended for use in clinical practice (Winstein et al., 2014). TOT has been tested in a randomized clinical trial (RCT); it has been shown to improve motor function in a clinical setting (Almhdawi, Mathiowetz, White, & delMas, 2016) and has been assessed in a single-subject design in the home setting (Rowe & Neville, 2017). Procedures for TOT have been based on earlier studies (Rowe & Neville, 2017; Winstein et al., 2013) and the previously discussed research (Lang & Birkenmeier, 2013). While evidence supports TOT in laboratory and clinical environments, more research is needed to better examine the translation of these principles into the person's home in a larger RCT. However, considering the time and effort required of a large RCT, the feasibility of conducting such a study needs to be determined.

The client's desire to resume roles, habits, and routines following a stroke, and the environmental demands on the client when he or she returns home, makes the home an ideal place to engage in TOT using real-world activities. Once discharged home, the client is faced with adapting to familiar, meaningful activities. Traditional home exercise programs frequently do not include functional tasks and are, therefore, difficult to assimilate into everyday living. Home exercise programs typically do not address the intensity and the specificity needed for recovery. At home, the clients can devote themselves to the specific training regime of TOT embedded in their habits and routines. Socially and culturally, the client can use TOT to regain, or redefine, occupational roles in his or her living situation and for community living (American Occupational Therapy Association, 2014). The home environment, without the time constraints of a clinic, can provide extensive time for practice. Extending TOT into the home and community enables the clients to experience the real-life benefits of improved performance.

As stated previously, TOT has had limited testing in the home setting (Rowe & Neville, 2017). The home, compared to the clinic, offers an array of meaningful tasks, in an environment familiar to the client, and with demand for practice beyond a given therapy schedule. The client can practice as much or as little at home and is not limited by schedules. Well-designed RCTs would be

required to determine the effect of TOT in clients' homes. A RCT is the most efficacious way to establish evidence-based practice interventions. However, is it feasible to conduct such a study and capture the data needed to determine practice? A feasibility study assesses aspects and components needed for larger trials (Drummond, 2017). Conducting data collection over weeks, and in a person's home, raises many operational questions, such as "How much time was needed to conduct each stage and aspect of the protocol?", "What kind of capacities, expertise, and availability were needed for planned research activities?", "What were the adherence rates to study procedures and engagement?", and "Do the assessments capture individual participants' needs and measure their responsiveness to these needs?"

This feasibility study examines the process, resources, management, and scientific value of implementing TOT in the home (Tickle-Degnen, 2013). The purpose is to describe evidence related to implementing the study and to help develop the protocol for a larger RCT. In this feasibility study, we assessed TOT in a program titled "Task-Oriented Training and Evaluation at Home" (TOTE Home) for people with mild to moderate hemiplegia who were finished with formal therapy and living at home to find out, "Is TOTE Home feasible, and what aspects can be improved upon in a larger RCT?"

Method

This feasibility study used a repeated measures design to assess aspects of implementing TOT with persons with hemiparetic upper extremity function. Areas of process, resources, management, and scientific value were analyzed for the feasibility of a larger RCT. The university institutional review board approved the protocol.

Participants

A convenience sample was obtained using the eligibility criteria that included mild to moderate hemiparesis with at least a minimum amount of movement that enabled the participants to adequately participate in the intervention. Potential participants were deemed ineligible if they demonstrated a paucity of movement, or based on their geographical location, continued therapy, or length of time since their stroke. Frequency of enrollment and geographical range was limited because of the availability of the one trained therapist.

Procedures

The TOTE Home intervention included a maximum of 30 1-hr sessions of training, with two to three session per week, in the participants' homes (see Rowe and Neville, 2017, for the TOTE Home intervention details). During each training session, the therapist (first author) and the participant worked closely to set up the task for training and problem solved any challenges.

Assessments were administered before (preintervention), immediately after (postintervention), and 1 month after the intervention (1-month follow-up). Assessments of movement included the Fugl-Meyer Assessment for the upper extremity (FMA) (Fugl-Meyer, 1980), the Motor Activity log (MAL) (van der lee, Beckerman, Knol, de Vet, & Bouter, 2004), and the Functional Test for the Hemiparetic Upper Extremity (FTHUE) (Wilson, 1984). The participants' perceptions of stroke recovery was assessed with the Stroke Impact scale (SIS) recovery question (Duncan et al., 1999). The Canadian Occupational Performance Measure (COPM) (Law et al., 2005) was used to assess the participants' self-perceptions of occupational performance. The same trained therapist administered all of the evaluations in the participants' homes.

All data forms were dated and identified with codes to protect the participants' identities. Data on hard copy forms were kept in time-sequential notebooks and then transferred to secure electronic databases on the same day of collection. The following forms were used throughout TOTE Home for each participant:

Initial visit:

- Demographics and inclusion/exclusion criteria (including minimal movement) form
- IRB approved consent form

Each treatment session:

- Daily task-specific training summary form (documentation form for daily notes)
- Participant ratings of effectiveness and therapist ratings of participant engagement pertaining to "Homework" activities (visual analog scales from 1-4)

Preintervention, Postintervention, and the 1-Month Follow-up assessments:

- Canadian Occupational Performance Measure (COPM) form
- Fugl-Meyer Assessment (FMA) of Upper Extremity Function form
- Motor Activity Log (MAL) form
- Functional Test of the Hemiparetic Upper Extremity (FTHUE) form
- Stroke recovery question from the Stroke Impact Scale (SIS)
- Task analysis form (form to describe each activity performed)

Data Analysis

The feasibility of this study was assessed following suggestions by Tickle-Degnen (2013). We reviewed the results of the study, and the process, both during and after completion of the study to address the areas of process, resources, management, and scientific value, and thereby ascertained a narrative analysis of the results.

Results

Process Feasibility

The process was assessed following guidelines outlined in Tickle-Degnen (2013) for eligibility, retention, adherence to procedures, and time for completion of assessments. Four out of the ten participants screened were eligible for enrollment in a 9-month period. All of the participants were retained throughout the intervention and at the 1-month follow-up. One participant requested to end treatment after 16 sessions because she met her goals and needed to, and could, return to work. All of the participants actively engaged in the intervention sessions and participated in some level of homework, as evidenced by verbal statements, requests to continue treatments, accelerometer data, and no drop outs.

The participants and the therapist assessed the ratings of adherence to study procedures at every treatment session. The participants rated the effectiveness of the homework activities, with an average rating of 3 out of 4 on a visual analogue scale. The therapist's ratings of the perception of the participants' engagement in homework activities were consistently high, with an average rating of 2.5 out of 4 on a visual analogue scale.

Data collection at preintervention, postintervention, and the 1-month follow-up took approximately 2 hr to complete at each interval. While this would not be a typical amount of time to evaluate a patient clinically, all of the participants of this research study tolerated it well.

Resources Feasibility

Resources were assessed for administration of treatment, equipment costs and availability, and practicality of activities identified. Treatment was administered three times a week for an average of 60 min. The same trained researcher administered all treatments. On average, the researcher dedicated approximately 5 hr a week, including treatment, travel, and documentation, to each participant. Thirty treatment sessions were sufficient to complete all aspects of the protocol. One participant reached her goals in 16 sessions and declined the last 14 sessions. This participant returned to work.

The only equipment provided by the researcher was the assessments. All materials for evaluations were easily transported and administered at regular tables and chairs in the participants' homes. The cost for assessments was less than $60. The FMA, MAL, FTHUE, and SIS are all available in the public domain. The COPM manual and forms were purchased. The protocol outlined in Winstein et al. (2013) is available in the public domain, and the manual by Lang and Birkenmeier (2013) was $50.

Any equipment used during the intervention was available in the participant's home. Most of the participants preferred to use their own personal items and to create their own adaptations. If the principle investigator made recommendations, the participants would often problem solve additional modifications. Equipment was always in a familiar place and available as needed.

The tasks identified by the participants were all practical in their home environments. The tasks included activities, such as yard work, home maintenance, playing board and card games, sewing, handwriting, gardening, cooking, and housework. In fact, all activities were more accessible in the participants' homes than in the clinical settings.

Management Feasibility

Management pragmatics were assessed based on scheduling; maintenance of assessment forms and daily logs; and organization, input, and analysis of data. While time for treatment was about 5 hr per week per participant, management is estimated at about 6 hr per week per participant. It was sufficient for one person to recruit, enroll, assess, and implement TOTE Home in this study in addition to working full time. A study with a larger sample would require additional personnel, including trained therapists, evaluators, a research coordinator, statisticians, and administrative assistants. The time commitments of each of these professionals would be dependent on the sample size and the deadline for completing a larger RCT.

For a RCT, the participants could be randomized into two groups, with the comparison group of usual and customary care. A *prior* power analysis was conducted using G*Power 3.1.9 to determine the minimum sample size that is required to find difference with a desired level of power set at .80, an alpha (α) level at .05, and a moderate effect size of .25 (f) for repeated measures analysis of variance (3 time points x 2 groups). It was determined that a minimum of 28 participants is required to ensure adequate power. With an expected attrition rate of 20%, a minimum of 34 participants would need to be recruited.

Scientific Value Feasibility

Scientific outcomes were assessed based on safety, level of burden on the participant, quality of assessments to measure outcomes of the participant's perceived and/or functional movement, and activity goal achievement. No adverse safety events occurred during this study. Fatigue was averted by allowing and encouraging the participants to rest when needed. At times, rest was needed because of physical exertion, and at other times, rest was needed because of mental fatigue (extensive concentration and focus). The mental fatigue often occurred as the challenge of the activity increased. Appropriate timing of appointments to meet the needs of both the therapist and the participant minimized the burden of frequency, intensity, and duration. Most of the participants reported wanting to continue the intervention after the follow-up. See Table 1 for a summary of the feasibility questions and outcomes based on Tickle-Degnen (2013).

Table 1

Summary of Feasibility Assessment Questions and Outcomes

Process	Resources	Management	Scientific Value
How many participants were eligible (based on inclusion criteria) during the 9-month time frame? Of those eligible, how many participated?	How much time was needed to conduct each stage and aspect of the protocol?	What was needed of the investigators' administrative capacity to manage the study?	What is the level of safety of TOTE Home?
Outcome: 4 out of 10 people screened were eligible and participated	*Outcome: Each treatment session was ~60 min per day, 3x/week, for 10 weeks. Each evaluation required ~2 hr.*	*Outcome: Scheduling of participants, maintenance of assessment forms and daily logs, and organization and input of data.*	*Outcome: No adverse events occurred.*
What were the retention and follow-up rates as the participants moved through the trial?	What equipment was needed?	What kind of capacities, expertise, and availability were needed for planned research activities?	What is the level of burden of the frequency, intensity, and duration of the intervention?
Outcome: All participants completed all evaluations (pre, post, and follow-up). 3 participants completed 30 intervention sessions, 1 participant completed 16 intervention sessions.	*Outcome: Evaluation equipment required for the FMA-UE and the FTHUE, forms required for the SIS, COPM, and MAL. Participants provided all intervention equipment.*	*Outcome: Flexibility and time in accommodating participants' schedules, training in administration of assessments and implementation of TOTE Home, organization of data entry, and knowledge of analysis.*	*Outcome: Fatigue was addressed as needed with rest breaks and appropriate scheduling. No other burden was noted.*
What were the adherence rates to study procedures and engagement?	Was the equipment in the correct place at the correct time?	How were data organized, named, and dated?	Do the assessments capture individual participants' needs and measure their responsiveness to these needs?
Outcome: Participants' average rating of the effectiveness of homework activities was 3.0 out of 4. Therapist's average ratings of the perception of participants' engagement in homework activities was 2.5 out of 4.	*Outcome: Evaluation equipment was easily transported by the therapist. Intervention equipment was chosen based on availability in the participants' homes.*	*Outcome: Data was dated and kept in sequential succession with coded names of participants in hard copy notebooks then transferred to secure electronic databases.*	*Outcome: All assessments, except the FTHUE, revealed changes in movement or participant satisfaction with movement and goal achievement.*
How feasible and suitable were eligibility criteria, data collection assessments, and amount of data collection?	Were tasks identified by clients practical in the environment?	What were the formats and structures of forms that document participant progress through the trial?	What assessment tools best capture functional movement changes, participant perceptions and satisfaction of recovery?
Outcome: Eligibility criteria was needed for successful completion of the intervention and evaluations. All assessments were valuable for evaluation except the FTHUE.	*Outcome: Tasks identified by the participants were all practical for their home environments.*	*Outcome: Fill in the blank, visual analog scales, open response, and assessment specific forms were utilized at each participant's initial visit, each treatment session, and at each evaluation interval.*	*Outcome: The FTHUE and FMA-UE assessed movement. COPM-Performance and MAL evaluated participant perceptions. COPM-Satisfaction and SIS assessed participant satisfaction of recovery.*

Note. COPM = Canadian Occupational Performance Measure; FMA-UE = Fugl-Meyer Assessment for the Upper Extremity (motor score); MAL = Motor Activity Log (average ratings); SIS = Stroke Impact Scale; FTHUE = Functional Test for the Hemiparetic Upper Extremity.

Discussion

To establish evidence-based practice in occupational therapy, feasibility studies are needed to aid in the implementation of clinical trials (Drummond, 2017). This paper reports the results of a feasibility study implementing TOTE Home. The aim of this study was to examine critical questions about implementing a TOTE Home program for upper extremity hemiparesis following a stroke. The process, management, resources, and scientific aspects were analyzed (Tickle-Degnen, 2013).

Process

The process of this study was acceptable but demonstrated a need for more personnel for a larger trial to accommodate a larger sample over a shorter time period. For a single participant, the time allotment would be 6 hr for the blinded evaluator (preintervention, postintervention, and the 1-month follow-up assessment intervals), and approximately 50 hr for the therapist (3 hr per week to administer the intervention, plus 2 hr per week for travel and documentation x 10 weeks). Specifically, two therapists for the customary treatment group, two therapists trained in implementing the TOTE Home intervention, and two blinded evaluators would be advantageous. More therapists over a larger geographic area would increase the potential number of eligible participants. Therapists would require training in implementing TOT depending on expertise. Training would need to be standardized with an established method for evaluating therapists initially and periodically throughout the study for validity and reliability. Geographical separation of experimental and control interventions may be required to maintain standard care as different from the TOTE Home intervention.

With the small number of participants in this study, retention and follow-up were not an issue. However, the potential of maintaining participants throughout the study might benefit from establishing the number of interventions based on each individual participant's progress. In this way, a participant that is progressing faster may need fewer treatment sessions than participants who are progressing at a slower rate. This may also encourage better compliance with homework activities by potentially shortening the burden of participation. In addition, a dose-response curve could be determined to inform clinical practice guidelines.

The participants rated homework as helpful, and the therapist rated the relatively high levels of engagement of the participants in completing homework. The perceived value of the homework by the participants and engagement in homework is supported by the theory of Occupational Adaptation (Schkade & Schultz, 1992; Schultz & Schkade, 1992). The client-centered nature of setting goals, engaging in supported practice, and then working independently in his or her home environment contributes to the sense of accomplishment and sense of mastery. As with most treatment interventions, alternative, personal ways to increase participation compliance will always be encouraged.

The participants needed at least the minimal amount of movement required for inclusion in this study, so that they could, at the least, begin to participate in activities with the weaker arm and hand. An intensive intervention program, such as this, would appear to be most beneficial for those with mild to moderate hemiparesis. The participants had generally positive outcomes on the measures used to assess the effectiveness of the intervention. Inclusion of more severe physical involvement is not recommended for a larger RCT study of TOTE Home. For persons with more involved motor deficits, evidence would suggest using additional preparatory interventions (functional electrical stimulation, robotics, mirror therapy for preparation) (Nilsen et al., 2014). With preparatory interventions, it is foreseeable that components of this intervention would be appropriate for those more severely affected with less movement.

Data collection was feasible and suitable in this study. Efforts to reduce the length of the data collection included limiting the SIS to only the overall stroke recovery question. In addition, ensuring that the evaluator has experience in administering all assessments increased efficiency. The COPM was critical in both helping to identify the participants' goals and as a measure of satisfaction and efficacy. Alternative assessments may be considered as appropriate for clinical practice settings. For a larger RCT, training of evaluators would need to be standardized with an established method for reviewing the evaluators initially and periodically throughout the study for validity and reliability in test administration.

Resources

Thirty treatment sessions were planned per participant based on previous TOT research (Winstein et al., 2016). This amount of time was more than adequate to complete all aspects of the intervention. The "dosing" of the treatment sessions might have been able to be reduced when sufficient progress had been demonstrated. Appropriate dosing may reduce the amount of resources required to achieve participants' goals, as well as aid in retention and compliance.

The equipment needed to complete the evaluations was not arduous for the therapist to bring into the participants' homes. It was also easy to administer and use assessment equipment in the participants' home settings. The nature of the intervention facilitated use of the participants' own equipment, as they practiced tasks in their environments with personal items. In fact, having the intervention in the home setting facilitated the practicality of the tasks. Guiding and teaching the participants how to appropriately grade the tasks was a key component of the intervention. This was evident when a participant chose tasks that were either too difficult or too easy for him or her to complete. The ability of the participants to work with their personal equipment and apply adaptive techniques might help them to continue repetitive task practice on their own after TOTE Home is finished, thus facilitating continued adaptation beyond therapy.

The principle investigator in this study completed extensive research and practical experience implementing TOT in previous larger clinical trials (Winstein et al., 2013; Wolf et al., 2006). For a RCT, the therapists will need to participate in training on implementation, depending on his or her level of experience. A model of weekly consultation with an expert may enhance the intervention.

Management

The delivery of TOTE Home could be implemented as a clinical intervention by one individual, as was evident in this study. However, a large RCT examining TOTE Home would require multiple professionals. General managerial characteristics would include organization, leadership, attention to detail, persistence, and adequate time. Specific qualities required of personnel include training and/or experience with administering outcome measures and TOT.

All data collection and the overall TOTE Home implementation must follow ethical standards and be approved by appropriate institutional review boards, as was done in this study. While data from this study was successfully managed by one person, a larger RCT might require a formal data safety monitoring board. This would ensure appropriate and accurate accountability and analysis of all data.

All data collection forms were useful and necessary in the study of TOTE Home. Assessment forms were vital in recording outcome measure data. Consent forms were necessary for participant understanding and voluntary participation. Forms that helped describe the sample and what happened during TOTE Home assisted in defining the nature of the intervention. While documentation can be laborious, it is necessary for reporting in research.

Scientific Value

Administration of TOTE Home proved to be a safe endeavour with no adverse side effects. Although 30 treatment sessions may be more excessive than the usual and customary home health care rehabilitation, the participants and the therapist did not report undue burden. In fact, both parties tended to want to continue therapy beyond the planned time line. Larger RCTs might consider an exit interview, such as that used in ExCITE (Winstein et al., 2003), to better capture and quantify the participants' feelings about participation. In addition, a trial with repeated measures of movement through use of activity logs and accelerometers may inform researchers on periods of recovery. In a larger study, the investigator would also need to manage all the aspects of a RCT, including ensuring accuracy of data entry and following IRB ethical standards.

All assessments (except for the FTHUE) used to evaluate TOTE Home were feasible and demonstrated mostly positive results. Evaluating multiple aspects of movement, function, and participant perception yielded a comprehensive assessment of the intervention. Although the FTHUE is a test of upper extremity function that is easily administered, it did not contribute much information to outcomes. Instead, it appeared to best help the participants determine factors that they needed to improve on and how to possibly grade tasks to the appropriate levels in planning their treatments. It facilitated the collaborative nature between the therapist and the participant.

Outcome Measures

The COPM is designed to detect change in a client's self-perception of occupational performance over time (Law et al., 2005). The COPM was an excellent measure used in TOTE Home to identify specific participant-centered goals in occupational performance, such as brushing teeth, buttoning buttons, and completing work activities. The COPM was also used to provide a rating of the participants' priorities in occupational performance, evaluate performance and satisfaction relative to those problem areas, and measure changes in the participant's perception of his or her occupational performance over the course of the intervention. The COPM helped the participants to identify specific activities that represented their desires, demands, and press for relative mastery. It also provided a means to monitor the participants' adaptive responses and the incorporation of occupational responses in their environments.

The FMA for the upper extremity is an assessment based on Brunnstrom's stages of recovery from stroke (Fugl-Meyer, 1980) and was used in the TOTE Home study as an outcome measurement of motor recovery. This is an analysis of the sensorimotor element in the person that directly affects one's desire for mastery (Schkade & Schultz, 1992; Schultz & Schkade, 1992).

The MAL was used as a standardized measure of real-world arm use before and after the TOTE Home intervention. The participants were asked to rate how much (Amount of Use scale) and how well (Quality of Movement scale) they used their more-affected arm for 30 ADL/IADL items (Taub et al., 1993). A minimal detectable change has not been determined for the MAL. However, an average rating of 3 (used weaker arm about half as much as before the stroke) was used in the ExCITE clinical trial to define learned non-use of the affected upper extremity for inclusion criteria (Wolf et al., 2006). The MAL goes beyond determining how much a person uses his or her affected arm and hand during functional tasks, but also asks how well the person thinks he or she is performing the tasks. The "Amount of Use" score could be interpreted as use of time and energy, while the "Quality of Movement" score could be interpreted as effectiveness and satisfaction to self and others. The Occupational Adaptation definition of relative mastery includes use of time and energy toward an effective, desired result that is satisfying to self and others. The MAL could be used as an excellent indicator relative to mastery.

The SIS (Duncan, Goldstein, Matchar, Divine, & Feussner, 1992) recovery question was used as a rating of recovery of the affected arm and hand in the TOTE Home study. Only the last question concerning perception of upper extremity hemiparesis recovery was asked in this study. This measure appears to be reflective of the amount of overall improvements noted in various outcomes for each participant. Occupational Adaptation could interpret this score as an overall, general measure of relative mastery. It is a global score, but one that could be assessed first to delve further into the specifics of why a person feels he or she has (or has not) recovered.

The FTHUE (Wilson, 1984) was used to evaluate the functional motor capability of the participants in TOTE Home. The use of this assessment seemed better at clinically evaluating the perceived motor capability of function by the occupational therapist and the participant. The process used by each participant gave both parties insight into capabilities and inabilities that were used in functional tasks, much like the way the FTHUE was used in the ICARE clinical trial (Winstein et al., 2013). This measurement best served this study as a subjective tool to assist in treatment planning, rather than as an objective measurement of function. In this way, the FTHUE can help operationalize the process outlined in the Theory of Occupational Adaptation. It can help both the client and the therapist identify the press for mastery, occupational challenges and responses, and the adaptive response and assessment of response processes.

Limitations

The results of this study are encouraging but should be interpreted with caution because of the small sample. As described above, a RCT with the appropriate power would best inform future practice. In addition to a small sample, this study did not have a comparison group. Whether 30 sessions of any type of occupational therapy would have resulted in similar outcomes (or if fewer sessions would be required) could be answered in a RCT. Despite the inability to draw conclusions on outcome measures from these four participants, this study's methods allowed us an adequate assessment of the feasibility.

Another limitation was that the first author functioned as the therapist and evaluator. The relationship the researcher had with the clients may have contributed to retention and each participant's intensity of practice. Therapists are trained in developing these intentional relationships, and this issue would be part of the training process for therapists involved in further research. Because the researcher was the evaluator, some outcomes could be the result of bias. However, the researcher was aware of the potential for bias, and through use of standardized testing, minimized the impact.

Conclusion

In conclusion, the TOTE Home intervention proved to be feasible. A larger clinical trial is justified and warranted to help determine the generalizability and effectiveness of TOTE Home. Of specific interest, a larger clinical trial would include more participants, address the question of dosing (are 30 treatment sessions required?), and use the FTHUE as more of an assist in treatment planning, rather than as an outcome measure, as has been done previously (Winstein et al., 2016).

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