Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods

Screening: Each site developed their own method for prescreening potential enrollees. For example, one site prescreened subjects in the outpatient stroke clinic to see if they could grasp a small block and raise it 6 inches. Another relied on referrals from the community, performing prescreening by phone. Two sites performed targeted prescreening at inpatient rehabilitation facilities. Several sites relied upon referring physicians to prescreen and thereby identify those patients most likely to meet study entry criteria. Another site keeps a registry of stroke survivors, members of which have all undergone prescreening at time of registry entry. Most sites reviewed the electronic medical record during admission to prescreen, approaching only those patients thought to be potentially eligible. Screening then followed at the initial study visit. In all cases, by the time of the formal, in-person screening visit, the population was enriched with those patients selected to be likely eligible and interested.

Assessment: Complete eligibility criteria appear below in eTable1. To maintain the assessor blind, all Assessment Therapists performed testing in a designated location spatially separated from Treatment Therapists. The amount of rehabilitation therapy the subject received since stroke onset was estimated at the first Visit. The amount of rehabilitation therapy the subject received during study participation was calculated 10 times: at each of the four live visits and at the end of every third supervised session.

The PACES asked subjects to rate eight statements regarding enjoyment of therapy using a 7-point Likert scale. Results were averaged and so final scores range from 1 to 7, with higher values indicating greater enjoyment. The OPS Scale asked subjects to rate 12 statements about their goal for improving arm function during therapy, also using a 7-point Likert scale, with half of the questions phrased in terms of engagement and half in terms of disengagement. Total OPS score is the sum of all goal engagement items and all reverse-coded disengagement items, divided by 12, with final scores range from 1 to 7, with higher values indicating greater goal engagement.

Each enrollee was asked weekly about adverse events, the amount of rehabilitation therapy received outside of study procedures, and number of minutes spent during each of the unsupervised treatment sessions. At the end of weeks 1 and 6, patients were rescored on the PACES and OPS Scales, and were also asked to complete a Patient Satisfaction Questionnaire on which they rated 10 components of treatment using a 7-point Likert scale, with scores ranging from 10-70 and with higher values indicating higher satisfaction.

Treatment: To develop each patient's treatment plan, the therapist reviewed subject data acquired at the Screening and Baseline Visits, including functional performance; the subject's stated personal goal; and sensory, vision, language, and motor deficits. The Treatment Therapist could change the daily treatment plan frequently or use the same one repeatedly according to his/her professional judgment, although the treatment plan was required to be formally revised twice, once after 6 supervised sessions (approximately after 2 weeks) and again after 12 supervised sessions (approximately after 4 weeks).

For subjects in both groups, a web-based, therapist-facing treatment planner program was developed to standardize treatment with respect to intensity, duration, and frequency. For each treatment session, Treatment Therapists used a graphical interface to drag treatment components into a 70-min daily planner, then adjusted difficulty and duration for each component.

For subjects in both groups, therapists recorded progress notes after each supervised session, and reviewed their progress notes prior to each supervised session.

There were 36 treatment sessions (18 supervised and 18 unsupervised), with the amount of activity in each session standardized across subjects and across groups. The goal was to complete these 36 sessions over a 6-week period, although subjects were permitted up to 8 weeks when necessary.

A core mechanism for standardizing therapy in both treatment groups was an algorithm that used the 33 impairment measurements of the FM arm motor assessment to suggest an initial treatment plan. The same algorithm was used across the two treatment groups. We assigned each of the 33 arm motor Fugl-Meyer measures to one of seven impairment categories. Thus when the 33 FM measurements for a given patient were entered into an online form, each measurement was assigned to one of seven impairment categories taken from the list of "key impairments" listed in the upper-extremity task-specific training manual[1] that helped guide the treatment approach; the manual notes that these seven categories "chosen to describe the impairments are general and consistent with patterns of weakness observed in people post stroke". These seven categories were decreased proximal strength, decreased distal strength, decreased grip strength, decreased pinch strength, decreased proximal motor control, decreased distal motor control, and decreased fine motor control. Based on this, the algorithm identified the three categories of greatest impairment for each patient. We also related each functional task (IC group), functional game (TR group), and exercise (both groups) to one of the seven impairment categories.

In this way, the exam identified the three categories with the greatest impairment, and the algorithm then listed the functional tasks (IC group), functional games (TR group), and exercises (both groups) that targeted these three greatest-impairment categories. The therapist then used his/her judgment to select from among the list provided by the algorithm to fill 30 of each day’s 70 therapy minutes, in a manner that was identical across treatment groups.

Stroke education, focusing on stroke prevention and risk factors, was provided at the start of each of the 18 unsupervised sessions and was delivered using multiple-choice questions. Subjects were given a 4-level multiple-choice question and asked to select the correct answer, after which the correct response and an explanation were provided. There were five categories of Jeopardy questions, focused on stroke prevention and risk factors: (1) diet, (2) stroke facts, (3) stroke risk factors, (4) effects of stroke, and (5) exercise. For IC group subjects, stroke education was provided via a paper stroke education booklet. For TR group subjects, stroke education was provided via the telerehabilitation system; questions were introduced using a Jeopardy game format, the subject selected a response, then correct answers and explanations appeared on the screen.

For subjects in the TR group, during the 30 minutes prior to the time outlined in the behavioral contract, the telerehabilitation system provided reminders that the session would soon begin. At any time of day, therapists could also review electronic usage data, game scores, and photographs taken during treatment, from all supervised and unsupervised sessions, and could also upload treatment plan changes to the subject's telerehabilitation system. If patients had questions, they were asked to wait until supervised session days unless urgent contact was needed.

For patients in the TR group, a member of the study team set it the TR system in an area with cellular connectivity, and reviewed use of the system with the subject. Subjects could only use the system for the assigned 70-minutes of therapy. The system remained on for the duration of the study, allowing transmission of updated itinerary details from therapist computer to the home and of patient usage/performance statistics from home to the UC Irvine central study site server, at any hour of day. Each game and exercise was preceded by instructions, with the patient hitting a “Go” button to proceed to play once review of instructions was completed. Patients in the TR group were able to pause the day's assignment as many times as desired. The therapist was able to define several game settings. These included duration (1-5 min) and difficulty (easy, moderate, or difficult) of play for all games; note that various cognitive motor control features were adjusted across levels of difficulty (eTable6). For certain games, the therapist could also choose which input device was to be used during game play, and whether photos would be taken (to inform therapists' assessment of performance and compliance).

For patients in the TR group, at the start of each of the 18 supervised sessions, a therapist at the research center initiated a videoconference with the subject’s telerehabilitation system at the time outlined in the behavioral contract. A 30-minute videoconference duration was selected, rather than the 70 minutes of face time provided during supervised sessions in the IC group, because a 70-minute videoconference was considered to be excessively long. The study supplied videoconferencing software (VSee) on all computers so that the therapist simply clicked to make a call, and the patient clicked to pick up the call on their home system. During the first 10 minutes, the therapist discussed treatment with the patient, and during the final 20 minutes, the therapist observed the patient performing assigned games and exercises.

Each telerehabilitation system also ran software (Teamviewer) that enabled study team members to remotely access the home-based telerehabilitation computer, which could be used to troubleshoot certain problems. Within 3 days of the last telerehabilitation session, a member of the site study team removed the telerehabilitation system from the subject's home.

Hardware: Subjects in both groups were given standard exercise hardware for home exercises, per the therapist's judgment, including resistive tubing (Theraband), rubber handball and dowel, putty, and a finger exerciser.

Subjects in the TR group also received a complete telerehabilitation system that included an internet-connected computer, camera, and 12 input devices used to drive game play. Specifically, each telerehabilitation system was composed of a 23.8-inch monitor housing a computer (Lenovo B50 with Intel Core i5-4460 processors and 8GM RAM with built-in webcam running Windows 7 Home Premium Edition.), table, chair, and a Verizon wireless modem (Jetpack MiFi 6620L) for 24-hour internet access. The 12 input devices used for therapy were a camera for videoconferencing, a PlayStation Eye camera, motion game controller (PlayStation Move), joystick, small buttons (10), large buttons (4), toy gun holding a Wii remote with corresponding IR sensor bar, trackpad (Logitech), grip force cylinder, pinch force cube, rotating shuttle wheel (Powermate, Griffin), and three-axis gyroscope/accelerometer/magnetometer (Myo armband; no EMG features were employed). All devices remained plugged in and turned on from the first day. Although all TR group subjects received all devices, therapists assigned device usage selectively based on clinical judgment.

Statistical Methodology: Multivariate imputation was performed using chained equations (R packages *mice* and *miceadds*) to approximate missing Post Therapy and 30 Day Follow Up FM scores, as well as measures of stroke knowledge gains, compliance, and motivation. Imputation regression estimates were obtained by pooling regression results with heteroscedasticity-consistent standard errors over 50 data sets.

Adjustments for age and baseline FM score were linear. Because of the nonlinear relationship between FM score and days post-stroke, regression estimates included a linear spline adjustment for days post-stroke with a single knot at 90 days[2,3].

For ITT with "worst-best-case" sensitivity analysis[4], missing dependent variable measures were filled in assuming that all patients with a missing assessment score who received IC group therapy had favorable outcomes (i.e., greater improvements from baseline), and all patients with a missing score who received TR group therapy had unfavorable outcomes (i.e., smaller improvements from baseline). Specifically, for FM score change from baseline to 30-day follow-up, IC group patients who were missing the 30-day follow-up FM score were assigned a value that was equal to the mean change in FM for the IC group *plus* two standard deviations of the mean. Patients in the TR group patients who were missing the 30-day follow-up FM score were assigned a value that was equal to the mean change in FM for the TR group *minus* two standard deviations of the mean. Analogous worst-best-case sensitivity analyses were performed for the assessment of change in Stroke Impact Scale scores (baseline to 30-day follow-up) and Box & Blocks scores (screening to 30-day follow-up).

Calculation of standard errors, used for confidence intervals, accounted for heteroscedasticity using the Huber-White sandwich estimator.

Two subgroup analyses were performed: [1] those enrolled <90 days post-stroke versus ≥90 days post-stroke; and [2] those with aphasia versus those lacking aphasia. These were not pre-specified subgroup analyses, but they were also not specified based on observations in the data. The first subgroup analysis was motivated by the fact that arm motor recovery generally reaches a plateau in patients with stroke by 90 days after stroke onset[2,3], and so we were curious to see how treatment gains differed for patients enrolled prior to the 90-day mark versus after the 90-day mark. The second subgroup analysis was motivated by the fact that there is some language function used to operate the telerehabilitation system, although many features of system design provided non-verbal cues and so tried to minimize language demands. As such, we were curious to see if motor gains varied according to aphasia status.

A linear mixed effects model was used to assess whether groups differed in change in Stroke Knowledge Exam scores from baseline to end of therapy. The dependent variable was the percent of questions answered correctly on the Stroke Knowledge Exam. The model included time, treatment group, and their interaction and was adjusted for days post-stroke at randomization (using same linear spline adjustment as above), age, and enrollment site. Subject was entered as a random effect.

A sub-aim examined whether gains in stroke knowledge were associated with improvements in control of three stroke risk factors: weight, systolic blood pressure (BP), and diastolic BP, correcting for multiple comparisons using the Holm method. Analyses were examined in relation to percent Stroke Knowledge Exam questions answered correctly at baseline and included as covariates age, days post-stroke at randomization, and site. This was repeated adding a term for treatment group plus an interaction term (treatment group X change in risk factor).

For analyses related to activity-inherent motivation, age, days post-stroke at randomization, enrollment site, and baseline PACES scores were included as covariates.

To compare consequence-related motivation between groups, the dependent variable was OPS score at baseline, the predictor of interest was treatment group, and the model included the covariates age, days post-stroke at randomization, and enrollment site. The relationship between consequence-related motivation and compliance was analyzed using compliance as the dependent variable, baseline OPS score as the predictor of interest, and age, days post-stroke at randomization, and enrollment site as covariates. To assess whether consequence-related motivation is related to compliance in a manner that varies according to activity-inherent motivation, a secondary analysis added an interaction term between baseline OPS score and baseline PACES score.

To compare compliance between groups, the dependent variable was compliance with therapy, the predictor of interest was treatment group, and the model included the covariates age, days post-stroke at randomization, and enrollment site.

Patient Satisfaction Questionnaire results were examined using as covariates age, days post-stroke at randomization, and site.

Additional evaluation of non-inferiority margin: In the comparison of treatment gains between groups, control for key covariates (baseline FM score, days post stroke at randomization, study site, age, and stroke subtype) was pre-specified and considered critical. Eleven subjects (9% of study population) demonstrated negative or 0 change in FM between the baseline and 30-day follow-up visit, precluding a direct evaluation of adjusted relative gains between groups with log-linear multiple regression. Thus the question of non-inferiority of TR was additionally evaluated using multiple linear regression with a modified change in FM score as the dependent variable, group assignment as the predictor of interest, and adjustment by baseline FM score, days post stroke at randomization, study site, age, and stroke subtype. The modified change in FM score is exactly the raw change in FM for TR subjects, and for IC subjects, it is each individual's change in FM score scaled by 0.7. The regression coefficient associated with treatment group is the estimated difference between mean FM change among TR subjects and 70% of the mean FM change among IC subjects (i.e. a 30% reduction from the mean FM change among IC subjects). Non-inferiority of TR is established when the lower bound of the 95% confidence interval for the treatment coefficient is greater than zero.

Sample size: The trial aimed to establish comparable efficacy based upon a non-inferiority margin of 30% of the ΔFM in the IC group, a value considered to be clinically acceptable to deem it to be non-inferior. Based on our pilot study[5], the mean within-subject ΔFM score for subjects in the TR group was expected to be 4.80±3.80 points, and so a reduction as high as 30% would estimate a ΔFM for the IC group of 6.85 points. Comparable efficacy would thus be established provided that the lower bound of the 95% CI for the difference between treatment groups in ΔFM score is greater than -2.05 points. Under these assumptions at alpha=0.05 and with SD=3.8 points, 124 subjects would need to be enrolled to provide 85% power, and this sample size was pursued independent of subject dropouts.

eResults

Non-inferiority of TR using the additional evaluation methods: The estimated difference comparing the mean FM change scores for TR subjects to the mean of 70% of FM change scores for IC subjects is 2.38 points (95% CI: 0.50 to 4.26; p=0.013). That is, we estimate that the mean change in FM for TR subjects exceeds the non-inferiority bound of 30% less than the mean change in FM for IC subjects by an estimated 2.38 points. The lower bound of the 95% confidence interval for this estimate is above zero, establishing the non-inferiority of TR therapy to IC therapy. Scaling FM change scores for IC subjects in this analysis, while modifying the conditional distribution of the outcome with the covariates, was found to have negligible effects on the estimated adjusted associations of each covariate with change in FM. Results did not differ in secondary analyses (eTable10).

Compliance: Unsupervised session durations were similar between groups, with the mean unsupervised session length for TR subjects being 0.5 (95% CI -2.2, 1.1) minutes shorter than for IC subjects (p=0.52).

Secondary motor endpoints: Gains were similar between proximal and distal FM arm motor subscores.

Results using the secondary motor endpoints B&B and SIS-hand motor were largely concordant with findings using the primary endpoint (FM score). The B&B scores increased from 21.3±13.3 at baseline to 30.8±13.3 at 30 days post-treatment (p<0.0001) in the TR group, and from 23.8±12.7 to 32.6±15.4 (p<0.0001) in the IC group. The adjusted mean difference between groups (TR-IC) in change over time was 0.95 blocks (p=0.512), the 95% CI for which ranged from -1.90 to3.80. The non-inferiority margin of -2.67 fell outside of this 95% CI, indicating non-inferiority of TR relative to IC therapy. SIS-hand scores went from 38.8±26.3 at baseline to 62.5±27.0 at 30 days post-treatment (p<0.0001) in the TR group, and from 42.6±24.1 to 71.8±20.6 (p<0.0001) in the IC group. The adjusted difference between groups (TR-IC) in change over time was -5.19 points (p=0.124), although here the non-inferiority margin of 8.45 did not fall outside of the 95% CI of -11.80 to 1.42. Change in FM score among the 10 subjects reporting arm/shoulder pain did not differ from the 104 subjects who did not report pain (p>0.5).

Motivation: Nine subjects lacked OPS and PACES scores, four having received no therapy sessions, two removed by their physician, and three due to assessment-tablet malfunction. Gains in activity-inherent motivation, reflecting how much a patient likes an activity and measured as change over time in PACES score, were 0.36 points higher in the IC compared to the TR group when measured from baseline to end of week 1 (p=0.043). This difference grew over time, as gains in activity-inherent motivation were 0.47 points higher in the IC compared to the TR group from baseline to end of week 6 (p=0.008), indicating larger boosts in activity-inherent motivation and enjoyment in the IC group (eTable2).

Consequence-related motivation, reflecting dedication to treatment goals, did not differ between groups at baseline (OPS scores of 4.78±0.58 in the TR group vs. 4.88±0.57 in the IC group, p=0.35). Compliance with therapy sessions was not associated with consequence-related motivation at baseline (p=0.93). This finding remained true when examining compliance as a function of the interaction between OPS and PACES scores.

Subjects rated the experience of trial participation favorably, providing high scores on the 70-point Patient Satisfaction Questionnaire (eTable3). IC group subjects reported slightly higher satisfaction at the end of the first (52.6±8.8 vs. 56.6±7.4, TR vs. IC, p<0.05) and sixth (55.2±7.7 vs. 58.5±8.0, p<0.05) week of therapy. The change over time did not differ between groups (p>0.6).

Correlates of stroke education: Weight and BP measurements were available at screening in 124 subjects and at follow-up in 113. Changes in diastolic/systolic BP and weight over the six weeks were small, and across all subjects these changes did not vary in proportion to gains in percent of Stroke Knowledge Exam questions answered correctly (adjusted p=0.99 for each association). Furthermore, the relationship that changes in BP and weight had with gains in percent of Stroke Knowledge Exam questions answered correctly did not significantly differ between groups (adjusted p=0.99).

eTable 1. Complete Eligibility Criteria

Inclusion criteria

1. Age ≥18 years at the time of randomization
2. Stroke that is radiologically verified, due to ischemia or to intracerebral hemorrhage, and with time of stroke onset 4-36 weeks prior to randomization
3. Arm motor FM score of 22-56 (out of 66) at both the Screening Visit and Baseline Visit
4. Box & Block Test score with affected arm is at least 3 blocks in 60 seconds at the Screening Visit
5. Informed consent signed by the subject
6. Behavioral contract signed by the subject

Exclusion criteria

1. A major, active, coexistent neurological or psychiatric disease, including alcoholism or dementia
2. A diagnosis (apart from the index stroke) that substantially affects paretic arm function
3. A major medical disorder that substantially reduces the likelihood that a subject will be able to comply with all study procedures
4. Severe depression, defined as GDS Score >10
5. Significant cognitive impairment, defined as Montreal Cognitive Assessment score < 22 (a lower score was permitted if due to aphasia and if allowed by the site PI)
6. Deficits in communication that interfere with reasonable study participation
7. A new symptomatic stroke has occurred since the index stroke that occurred 4-36 weeks prior to randomization
8. Lacking visual acuity, with or without corrective lens, of 20/40 or better in at least one eye
9. Life expectancy < 6 months
10. Pregnant
11. Receipt of Botox to arms, legs, or trunk in the preceding 6 months, or expectation that Botox will be administered to the arm, leg, or trunk prior to completion of the 30-Day Follow Up Visit
12. Unable to successfully perform all 3 of the rehabilitation exercise test examples
13. Unable or unwilling to perform study procedures/therapy, or expectation of noncompliance with study procedures/therapy
14. Concurrent enrollment in another investigational study
15. Non-English speaking, such that subject does not speak sufficient English to comply with study procedures
16. Expectation that subject cannot participate in study visits
17. Expectation that subject will not have a single domicile address during the 6 weeks of therapy, within 25 miles of the central study site and with Verizon wireless reception.**

**A site may enroll a person who does not meet exclusion criterion # 17 if this is specifically approved by the site's study PI.

eTable 2. Data Collection Schedule

Assessment	Screening	Baseline	End of 3 Supervised Sessions	End of 6 Supervised Sessions	End of 9 Supervised Sessions	End of 12 Supervised Sessions	End of 15 Supervised Sessions	End of 18 Supervised Sessions	Post-therapy	30 Day Follow Up	End of Study
Obtain Informed Consent	X										
Eligibility criteria	X										
Medical History	X										
Arm Motor Fugl-Meyer Scale	X	X							X	X	
Box & Blocks Test	X								X	X	
Montreal Cognitive Assessment	X										
Geriatric Depression Scale	X										
modified Ashworth Spasticity Scale (wrist)	X										
Nottingham Sensory Scale	X										
Blood pressure & weight	X									X	
modified Rankin Scale	X									X	
NIH Stroke Scale	X										
Stroke Knowledge Exam	X								X		
Record amount of non-study rehabilitation therapy	X	X	X	X	X	X	X	X	X	X	

(Pre-Stroke) Handedness Inventory		X									
Medication list	X	X	X	X	X	X	X	X	X	X	
Stroke Impact Scale-Hand Subsection		X							X	X	
Physical Activity Enjoyment Scale (PACES)		X	X					X			
Optimization in Primary and Secondary Control Scale (OPS)		X	X					X			
Randomization		X									
Patient Satisfaction Questionnaire			X					X			
Adverse Events			X	X	X	X	X	X	X	X	
Measure Therapy Compliance			X	X	X	X	X	X			
End-of-Study Form											X

<u>Timing of Visits</u>:

- Screening Visit: 3-35 weeks after stroke onset
- Baseline Visit (includes randomization): 1-21 days after Screening Visit (target value = 7 days), and 4-36 weeks after stroke onset
- First therapy session: 1-10 days post-randomization (target value < 5 days)
- Post-therapy Visit: 1-6 days after the last therapy session (target value = 2 days)
- 30 Day Follow Up Visit: 25-35 days after the last therapy session (target value = 30 days)

eTable 3. The 88 Exercises for IC and TR Groups

A total of 88 arm exercises were available, and were identical across the two treatment groups. These exercises were selected in order to incorporate standard rehabilitation therapy approaches including active range of motion, trunk activation, reaching, stretching, weight bearing, grasp/release, and strengthening. These were assigned per the therapist's judgment and could employ the standard exercise equipment that the study provided to all enrollees.

Exercise	Body Area	Details	Directions
1. Active Range of Motion (AROM)	Shoulder	Shrug Sitting	Squeeze shoulder blades together. Raise shoulders toward ears. Lower shoulders.
2. Active Range of Motion (AROM)	Shoulder	Neck Sidebend	Gently bend head to each side. Try to touch your ear to your shoulder.
3. Active Range of Motion (AROM)	Shoulder	Circle Sitting	Roll shoulders in a circle. Circle forward and backward.
4. Active Range of Motion (AROM)	Shoulder	Pinch Sitting	Pinch shoulder blades together and hold. Do not shrug shoulders.
5. Active Range of Motion (AROM)	Shoulder	Abduction Unilateral	Raise arm out and up palm up. Keep elbow straight. Do not shrug shoulders.
6. Active Range of Motion (AROM)	Shoulder	Flexion Unilateral	Raise one arm overhead. Keep thumb pointed up.
7. Active Range of Motion (AROM)	Shoulder	Diagonal Up and Away	Start with arm down and across body. Raise arm up and out. Open hand, straighten elbow. Repeat.
8. Active Range of Motion (AROM)	Shoulder	Diagonal Down and Across	Start with arm up and out. Move arm down and across body. End with palm down.
9. Active Range of Motion (AROM)	Shoulder	Diagonal Down and Away	Start with arm at opposite shoulder, palm down. Move arm down and away. End with elbow straight.
10. Active Range of Motion (AROM)	Shoulder	Internal/External Rotation	With your arm at your side, palm facing in, raise your arm straight out to shoulder height. Bending the elbow, raise your hand up towards the ceiling, then down towards the floor.
11. Active Range of Motion (AROM)	Shoulder	Shoulder flexion Bilateral	Raise arms overhead at the same speed. Keep elbows straight.

12. Active Range of Motion (AROM)	Shoulder	Shoulder Internal and External Rotation	Use one arm to rotate other arm toward body and then rotate arms in the opposite direction.
13. Trunk Activation	Shoulders/ Trunk	Cane side to side	Hold cane or dowel with both hands. Raise arms to shoulder level. Rotate trunk left, then right. Keep back straight.
14. Trunk Activation	Trunk/ Pelvis	Pelvic Tilt	Start in a slumped position. Roll pelvis forward to arch back.
15. Trunk Activation	Trunk/Shoulder	Forward Lean on Table	Place a hand towel under affected arm. Lean forward and straighten elbow.
16. Reaching/Targeting	Shoulder/ Head	Behind Head	Raise arm and reach to back of head. Do not shrug shoulders. Hold.
17. Active Range of Motion (AROM)	Elbow	Elbow Extension	Slide arm down leg.
18. Active Range of Motion (AROM)	Elbow	Bicep Curl	Begin with elbow straight and palm facing forward. Bend elbow.
19. Active Range of Motion (AROM)	Forearm	Pronation/Supination	Keep your arms at your side with elbows bent. Turn your hand so that the palm faces up, then down. Repeat.
20. Active Range of Motion (AROM)	Wrist	Extension No Gravity	Rest arm and hand on surface with thumb up. Move hand away from body. Return, then repeat.
21. Active Range of Motion (AROM)	Wrist	Extension Against Gravity	Rest arm and hand on surface, palm down. Raise hand up. Relax and repeat.
22. Active Range of Motion (AROM)	Wrist	Flexion No Gravity	Rest arm and hand on surface with thumb up, move hand toward body. Relax and repeat.
23. Active Range of Motion (AROM)	Wrist	Flexion Against Gravity	Rest arm and hand on surface, palm up. Raise hand up. Relax and repeat.
24. Active Range of Motion (AROM)	Wrist	Radial Deviation No Gravity	Rest arm and hand on surface, palm down. Move hand toward body. Relax and repeat.
25. Active Range of Motion (AROM)	Wrist	Radial Deviation Against Gravity	Rest arm and hand on surface, thumb up. Move hand up toward body.
26. Active Range of Motion (AROM)	Wrist	Ulnar deviation No Gravity	Rest arm and hand on surface, palm down. Move hand away from body.
27. Active Range of Motion (AROM)	Hand/Fingers	Extension	Rest hand on surface, palm down. Open fingers until hand is flat. Return to resting position and repeat.

28. Active Range of Motion (AROM)	Hand/Fingers	Flexion	Rest hand on surface, thumb up. Close fingers to make a fist. Open hand and repeat.
29. Active Range of Motion (AROM)	Hand/Fingers	Alternate Flexion/Extension	Rest hand on surface, palm down. Close fingers to make a fist, open fingers until hand is flat. Alternate.
30. Active Range of Motion (AROM)	Hand/Fingers	Abduction	Rest hand on surface, palm down. Spread fingers to separate. Return to resting position then repeat.
31. Active Range of Motion (AROM)	Hand/Fingers	Adduction	Rest hand on surface, palm down. Close fingers until they are touching. Hold for 3 seconds. Relax and repeat.
32. Active Range of Motion (AROM)	Hand/Fingers	Alternate Abduction/Adduction	Rest hand on surface, palm down. Spread fingers to separate, close fingers. Alternate.
33. Active Range of Motion (AROM)	Hand/Fingers	Finger Extension	Place your palm flat on a table. Raise and lower your fingers one by one. Repeat.
34. Active Range of Motion (AROM)	Hand/Fingers	Finger Opposition	Make an "O" by touching your thumb to each fingertip.
35. Active Range of Motion (AROM)	Hand/Fingers	Finger Flexion	Bring the fingertips in tightly to the top of the palm of your hand. Keep your first knuckles straight. Open fingers fully.
36. Active Range of Motion (AROM)	Hand/Fingers	Thumb Flexion	Bend your thumb toward the base of your little finger. Spread the thumb away from the index finger.
37. Self Range of Motion (SROM)	Elbow	Elbow Flexion	Clasp hands together, bend both elbows. Return to starting position and repeat.
38. Self Range of Motion (SROM)	Elbow	Elbow Extension	Clasp hands together, straighten both elbows.
39. Self Range of Motion (SROM)	Wrist	Wrist Extensors	Hold arm out in front of body. Elbow straight, palm down. Use opposite hand to bend wrist down until gentle stretch is felt on top of arm. Hold for 30 seconds.
40. Self Range of Motion (SROM)	Wrist	Wrist Flexors	Hold arm out in front of body. Elbow straight, palm down. Use opposite hand to bend wrist up until gentle stretch is felt under arm. Hold for 30 seconds.
41. Self Range of Motion (SROM)	Hand/Fingers	Fingers Extension	Use opposite hand to straighten each finger as shown.

42. Self Range of Motion (SROM)	Hand/Fingers	Fingers MP Extension	Use opposite hand to gently move each finger back at knuckle.
43. Self Range of Motion (SROM)	Hand/Fingers	Fingers DIP Extension	Use opposite hand to gently move each finger back above last knuckle.
44. Self Range of Motion (SROM)	Hand/Fingers	Fingers PIP Extension	Use opposite hand to gently move each finger back at tip.
45. Self Range of Motion (SROM)	Hand/Fingers	Finger Extension	Use opposite hand to straighten fingers.
46. Stretching	Shoulder	Shoulder Posterior Capsule	Place hand over elbow. Stretch arm across body and hold.
47. Stretching	Shoulder	Inferior Capsule	Raise elbow above head. Gently press down on elbow with other hand. Do not push on head.
48. Stretching	Chest	Hands Behind Head	Place both hands behind head. Lift chest and separate elbows and hold.
49. Stretching	Shoulder	Flexion on Table	Place hands on table, elbows straight. Press hands down into table, slide hands forward, and hold.
50. Stretching	Trunk	Rotation	Sit with upright posture. Rotate body until gentle resistance is felt.
51. Weight Bearing	Upper Extremity	Sitting Opening	Push hand into leg. Keep elbow straight.
52. Weight Bearing	Upper Extremity	Sitting Weight on Forearms	With forearms on table, shift weight from side to side.
53. Weight Bearing	Upper Extremity	Sitting Weight on Hands	Place both hands on sitting surface. Shift weight from side to side.
54. Weight Bearing	Upper Extremity	Sitting Elbow Extension	Slide hand down leg.
55. Weight Bearing	Upper Extremity	Sitting Reach Up and Across Body	Lean on left hand. Reach up and across body with other hand. Hold.
56. Grasp/Release	Hand	Transfer Object	Grasp and hold object with one hand. Transfer object to other hand. Reverse. Use objects of different shapes, sizes and weight.
57. Grasp/Release	Hand	Stack Cups	Grasp stack of cups with your strong hand. Stack/unstack cups with your other hand.
58. Grasp/Release	Hand	Roll Dice	Use both hands to roll dice.
59. Sensory Motor	Upper Extremity	Open/Close	Look at hand while opening and closing.
60. Sensory Motor	Hand/Fingers	Verbal Open	Say "OPEN" while opening hand. Relax, then repeat.
61. Sensory Motor	Hand/Fingers	Verbal Close	Say "CLOSE" while closing hand. Relax, then repeat.

62. Sensory Motor	Hand/Fingers	Symmetrical Open	Open both hands at same time. Relax, then repeat.
63. Sensory Motor	Hand/Fingers	Symmetrical Close	Close both hands at same time. Relax, then repeat.
64. Sensory Motor	Hand/Fingers	Symmetrical Open/Close	Open both hands at same time, close both hands at same time. Repeat.
65. Sensory Motor	Hand/Fingers	Asymmetrical Open/Close	Open one hand while closing other hand. Alternate.
66. Sensory Motor	Upper Extremity	Open With Elbow Extension	Rest hand on leg, straighten elbow. Open hand.
67. Sensory Motor	Upper Extremity	Reach/Opening	Reach one arm forward toward target. Open other hand at same time. Alternate
68. Sensory Motor	Upper Extremity	Reach/Closing	Reach one arm forward and grasp object. Close other hand at same time. Alternate.
69. Sensory Motor	Upper Extremity	Desensitization	Wipe different textures across affected hand and/or arm.
70. Strengthening Exercises	Shoulder	Shoulder Flexion	Hold weight in hand. Keeping elbow straight, raise arm overhead and back down
71. Strengthening Exercises	Shoulder	Shoulder Abduction	Hold weight in hand. Keeping arm straight, lift arm out to side to shoulder height. Return arm to side.
72. Strengthening Exercises	Elbow	Elbow Extension	Lean forward slightly. Keeping elbow behind you, straighten elbow to lift weight. Bend elbow and repeat.
73. Strengthening Exercises	Elbow	Elbow Flexion	Hold weight in hand at your side. Bend, then straighten elbow.
74. Strengthening Exercises	Wrist	Forearm Pronation/Supination	Hold weight in hand with elbows bent to 90 degrees. Turn palm up and down.
75. Strengthening Exercises	Wrist	Wrist Extension	Hold weight in hand with palm facing downward, elbow bent to 90 degrees at side. Lift wrist up and down (wrist movement only).
76. Strengthening Exercises	Wrist	Wrist Flexion	Hold weight in hand with palm facing up, elbow bent to 90 degrees at side. Lift wrist up and down (wrist movement only).
77. Theraband	Shoulder	Shoulder Rotation	Hold band with palms up. Keep both elbows close to your side. Pull both hands apart. Return back to center.
78. Theraband	Elbow	Elbow Extension	Hold band, resting both hands on front of chest. Push one arm straight out in front, palm down. Return to starting position and repeat.
79. Theraband	Elbow	Elbow Flexion	Hold band hands down at lap, palms up. Bend one arm, pulling band up

			toward your shoulder. Return arm back to lap and repeat.
80. Theraband	Shoulder	Shoulder Depression	Hold one end of band in each hand. Hold one end up at the shoulder. Push the other hand toward floor. Relax and repeat.
81. Theraband	Shoulder	Shoulder Horizontal Abduction	Hold band with palms facing in and arms extended. Keep arms straight while pulling both arms out to the sides, squeezing shoulder blades together.
82. Hand Ball Exercises	Hand	Hand Exercise	Place all fingers under rubber band. Gently squeeze ball, then slowly release.
83. Hand Ball Exercises	Hand	Hand Exercise	Place all fingers under the rubber band. Extend each finger, one at a time, then slowly release.
84. Finger Exerciser	Fingers	Finger Flexion	Place each finger onto the corresponding button. Gently flex all fingers, squeezing buttons, then slowly release.
85. Finger Exerciser	Fingers	Finger Flexion	Place each finger onto the corresponding button. Gently flex each finger separately, squeezing the buttons, then slowly release.
86. Putty	Fingers	Finger Intrinsics	Flatten putty by separating fingers. Keep fingers straight. Relax and repeat.
87. Putty	Fingers	Finger Flexion	Place hand over flat putty. Gather putty into a ball. Relax and repeat.
88. Putty	Fingers	Finger /Extension	Open hand and fingers to flatten putty. Relax and repeat.

eTable 4. Games and Their Adjustable Features

Name of Game	Summary of Game	Input Device Options	Motor Control Features That Can Be Adjusted
1. Black Jack	Subject plays rounds of black jack against a dealer.	• Large Buttons	Cognitive demand: longer games taxed attention and problem-solving skills to a greater extent: longer games taxed attention and problem-solving skills to a greater extent Bimanual: the therapist could instruct the subject to play unimanually or bimanually.
2. Bubble Pop	Subject uses the input device to move a cursor on the screen in order to pop the bubbles rising from the bottom of the screen.	• PlayStation Move • Wii Remote • Trackpad	Visuomotor: Higher difficulty level setting provided smaller bubble targets, taxing eye-hand coordination Proximal vs. distal: use of the PlayStation Move and Wii remote emphasized proximal motor control; use of the trackpad, distal control Sustained control: Higher difficulty level setting required a longer duration of time during which the cursor had to be held on target
3. Button Press	Subject presses the button on the tabletop that matches the image of the button that appears on the screen.	• Large Buttons • Small Buttons	Range of motion: Higher difficulty level setting meant a larger number of button targets were available to the game and thus a larger area of game play Speed of movement: Higher difficulty level setting reduced time available for subject to successfully press the target button
4. Carnival Shooting	Subject uses the input device to control the cursor on the screen in order to shoot the yellow and white ducks/avoid the red ducks that scroll across.	• PlayStation Move • Wii Remote • Trackpad	Visuomotor: Higher difficulty level setting meant faster target movement speeds Movement timing: Higher difficulty level setting meant more frequent obstructions over target requiring careful timing
5. Clay Shooting	Subject uses the input device to control the cursor on the screen in order to shoot the clay targets that appear on the screen, then disappear at a distance.	• PlayStation Move • Wii Remote • Trackpad	Visuomotor: Higher difficulty level setting meant smaller clay pigeon targets Proximal vs. distal: use of the PlayStation Move and Wii remote emphasized proximal motor control; use of the trackpad, distal control Reaction time: Higher difficulty level meant clay pigeons moved faster, demanding quicker reactions Cognitive demand: Higher difficulty level required greater vigilance for clay pigeon release.
6. Cut The Rope	Subject uses the input device to control the cursor on the screen to	• PlayStation Move • Wii Remote • Trackpad	Visuomotor: Higher difficulty level setting meant shorter rope length targets Range of motion: Higher difficulty level setting meant a larger area where rope targets could appear

	cut the candy cord and feed the animated character.		Proximal vs. distal: use of the PlayStation Move and Wii remote emphasized proximal motor control; use of the trackpad, distal control
7. Driving	Subject uses the input device to control the car on screen that must drive through the colored cones to score credits.	• Powermate • Myo Armband • Trackpad	Visuomotor: Higher difficulty level required greater visuomotor skill as the driving course had more curves to maneuver Cognitive demand: Higher difficulty level required greater vigilance to stay on road
8. Drums	Subject presses the buttons on the tabletop that match the images of the series of buttons that appear on the screen to play the drum beat.	• Large Buttons • Small Buttons	Range of motion: Higher difficulty level setting meant a larger area where targets could appear Speed of movement: Higher difficulty level setting reduced time available for subject to successfully press the target button
9. Duck Hunt	Subject uses the input device to control the cursor on the screen in order to shoot the ducks that appear on the screen before they reach the top of the screen.	• PlayStation Move • Wii Remote • Trackpad	Visuomotor: Higher difficulty level setting meant faster target movement speeds Proximal vs. distal: use of the PlayStation Move and Wii remote emphasized proximal motor control; use of the trackpad, distal control
10. Flappy Bird	Subject uses the input device to make the duck flap its wings and rise in the air in order to maneuver through the openings in the pipes.	• Large Buttons • Grip Force Cylinder • Pinch Force Cube • Playstation Move • Trackpad	Visuomotor: Higher difficulty level setting meant narrower passages to navigate Motor planning: Higher difficulty level setting meant greater need to anticipate future challenges with less available time
11. Jewel Match	Subject uses the input device to rotate the wheel of jewel shapes to match the jewel shape as it scrolls across the top of the screen.	• Powermate • Myo Armband • Trackpad	Motor planning: Higher difficulty level setting meant greater need to anticipate future challenges with less available time. Visuomotor: Higher difficulty level setting meant faster target movement speeds and required greater movement precision

12. Concentration Memory Game	Subject uses the input device to control the cursor on screen to select an initial card then select a second matching card.	• Playstation Move • Wii Remote • Trackpad	<u>Cognitive demand</u>: Higher difficulty level required greater memory function, as a larger number of items to be remembered were presented <u>Range of motion:</u> Higher difficulty level setting meant a larger area where card targets could appear <u>Sustained control</u>: Higher difficulty level setting required a longer duration of time during which the cursor had to be held on target <u>Proximal vs. distal</u>: use of the PlayStation Move and Wii remote emphasized proximal motor control; use of the trackpad, distal control
13. Piano	Subject presses the buttons on the tabletop that match the images of the series of buttons that appear on the screen to play the piano.	• Large Buttons • Small Buttons	<u>Range of motion:</u> Higher difficulty level setting meant a larger area where targets could appear <u>Speed of movement</u>: Higher difficulty level setting reduced time available for subject to successfully press the target button
14. Pachinko	Subject uses the input device to attain balls at the bottom right of screen and drop balls at the top of the peg board, trying to land in the highest numbered slots at the bottom of the board.	• Playstation Move • Wii Remote • Trackpad	<u>Visuomotor</u>: Higher difficulty level setting meant fewer positions that achieved success and so required more precise movements <u>Sustained control</u>: Higher difficulty level setting required a longer duration of time during which the cursor had to be held on target <u>Proximal vs. distal</u>: use of the PlayStation Move and Wii remote emphasized proximal motor control; use of the trackpad, distal control
15. Video Poker	Subject plays rounds of video poker.	• Large Buttons • Small Buttons	<u>Cognitive demand</u>: longer games taxed attention and problem-solving skills to a greater extent: longer games taxed attention and problem-solving skills to a greater extent <u>Bimanual</u>: the therapist could instruct the subject to play unimanually or bimanually.
16. Range Of Motion	Subject uses the input device to move the gauge into the target area and hold it there until the progress meter is complete to score a point.	• Playstation Move • Wii Remote • Trackpad	<u>Sustained control</u>: Higher difficulty level setting required a longer duration of time during which the cursor had to be held on target <u>Speed of movement</u>: Higher difficulty level setting reduced time available for subject to successfully reach the target <u>Proximal vs. distal</u>: use of the PlayStation Move and Wii remote emphasized proximal motor control; use of the trackpad, distal control <u>Visuomotor</u>: Higher difficulty level setting meant smaller targets to hit and thus demanded more precise

			movements
17. Reaction Time	Subject rests and holds hand on the initial button indicated until the screen turns red. When the screen turns green, subject presses the target button as fast as possible with the same hand.	• Large Buttons • Small Buttons	Range of motion: Higher difficulty level setting meant a larger area where targets could appear, including proximal vs. distal target option Visuomotor: Higher difficulty level setting meant smaller targets
18. Simon	Subject presses the large button/series of buttons that lights up on the tabletop.	• Large Buttons	Cognitive demand: Higher difficulty level provided less time to respond Speed of movement: Higher difficulty level setting reduced time available for subject to successfully press the target button Perspective: Therapist could instruct patient to play using a first-person perspective (looking at targets as they light up on the tabletop) or a third-person perspective (looking at targets when they appear on the computer monitor)
19. Slots	Subject presses the button to start/stop the slots spinning with the goal of lining up similar fruit images.	• Large Buttons	Visuomotor: Higher difficulty level setting meant faster target movement speeds Movement timing: Higher difficulty level setting meant less time to make a move that aligned spinning wheels
20. Solitaire	Subject plays a round of solitaire.	• Playstation Move • Wii Remote • Trackpad	Bimanual: this game required two hands to play, thus a therapist selecting it for a patient was requiring a bimanual functional task Cognitive demand: Higher difficulty level meant less time available to process and proceed Proximal vs. distal: use of the PlayStation Move and Wii remote emphasized proximal motor control; use of the trackpad, distal control
21. Space Invaders	Subject uses the input device to control the alien shooter on screen before they reach the bottom.	• Powermate • Myo Armband • Trackpad	Visuomotor: Higher difficulty level setting meant faster targets to hit Motor planning: Higher difficulty level setting meant higher demand and less time to anticipate target movements and plan accordingly

22. Targeting	Subject uses the input device to move the gauge into the square target area and hold it there until the progress meter is complete in order to score a point.	• Grip Force Cylinder • Pinch Force Cube Playstation Move • Myo Armband • Powermate	Visuomotor: Higher difficulty level setting meant smaller targets to hit and thus demanded more precise movements Sustained control: Higher difficulty level setting required a longer duration of time during which the cursor had to be held on target
23. Tempest	Subject uses the input device to control the alien spaceship shooter on the screen before it reaches the outer border.	• Powermate • Myo Armband • Trackpad	Visuomotor: Higher difficulty level setting meant faster targets to hit Motor planning: Higher difficulty level setting meant higher demand and less time to anticipate target movements and plan accordingly
24. Water Race	Subject uses the input device to control the water shooter on the screen aimed at colored targets that move the same colored horses across the finish line.	• Powermate • Myo Armband • Trackpad	Visuomotor: Higher difficulty level setting meant faster targets to hit Motor planning: Higher difficulty level setting meant higher demand and less time to anticipate target movements and plan accordingly to stay on target and to match target colors Sustained control: Lower difficulty level setting meant slower targets and so required a longer duration of time during which the cursor had to be held on target
25. Whack A Mole	Press/whack each button when it lights up.	• Large Buttons	Range of motion: Higher difficulty level setting meant a larger area where targets could appear, including proximal vs. distal target option Left hemifield bias: At medium difficulty setting, a higher fraction of the targets are on the left side of the player's space Visuomotor: Higher difficulty level setting meant shorter duration of time available to hit the target Perspective: Therapist could instruct patient to play using a first-person perspective (looking at targets as they light up on the tabletop) or a third-person perspective (looking at targets when they appear on the computer monitor)

eTable 5. Usage Statistics for Each of the 25 Games in the TR Group

Name of Game	**Percentage of subjects who ever played the game**	**Percentage of all possible days that the game was played**
1. Black Jack	57.9 %	28.2 %
2. Bubble Pop	100 %	66.3 %
3. Button Press	80.7 %	43.8 %
4. Carnival Shooting	82.5 %	42.2 %
5. Clay Shooting	71.9 %	33.3 %
6. Cut The Rope	89.5 %	58.8 %
7. Driving	87.7 %	45.8 %
8. Drums	70.2 %	37.9 %
9. Duck Hunt	77.2 %	45.4 %
10. Flappy Bird	100 %	86.2 %
11. Jewel Match	82.5 %	47.4 %
12. Concentration Memory Game	80.7 %	40.9 %
13. Piano	82.5 %	53.7 %
14. Pachinko	79.0 %	37.2 %
15. Video Poker	47.4 %	19.7 %
16. Range Of Motion	86.0 %	44.6 %
17. Reaction Time	82.5 %	53.0 %
18. Simon	36.0 %	19.7 %
19. Slots	57.9 %	25.5 %
20. Solitaire	54.34 %	20.0 %
21. Space Invaders	96.5 %	57.5 %
22. Targeting	98.3 %	85.0 %
23. Tempest	73.7 %	40.3 %
24. Water Race	89.5 %	58.3 %
25. Whack A Mole	86.0 %	54.3 %

eTable 6. Usage Statistics for Each of the Input Devices in the TR Group

Name of Game	Percentage of subjects who ever used the device	Percentage of all possible days that the device was used
1. Toy gun holding a Wii remote	71.9 %	26.4 %
2. PlayStation Move	98.3 %	79.0 %
3. Accelerometer/gyroscope (Myo armband)	54.4 %	30.5 %
4. Rotating shuttle wheel	100 %	81.7 %
5. Grip force cylinder	96.5 %	78.1 %
6. Pinch force cube	91.2 %	66.6 %
7. Trackpad	93.0 %	69.9 %
8. Buttons	100 %	95.5 %

Data are not given for the joystick, which was used daily by TR group patients as part of systems operations; the videoconferencing camera, which was used during all supervised sessions; or the PlayStation Eye camera, which worked in concert with the PlayStation Move. Data for the 4 large buttons and the 10 small buttons are combined into a single "Buttons" category.

eTable 7. Rehabilitation Therapy Received Outside of Study Procedures

	Physical Therapy	**Occupational Therapy**	**Speech Therapy**
PRIOR TO ENROLLMENT: Rehabilitation therapy dose (hours), from stroke onset to time of study enrollment	30 [18-47]	28 [16-41]	12 [2-30]
DURING STUDY PARTICIPATION: Rehabilitation therapy dose (hours), from time of study enrollment to Day-30 Follow-up Visit	2 [0-18]	1 [0-12]	0 [0-1]

Values are median [IQR].

eTable 8. Activity-Inherent Motivation (Change in PACES Scores)

	Telerehabilitation	**In-Clinic**	**Overall**
N	57	57	114
PACES scores			
Baseline Visit	4.82±1.45	4.66±1.35	4.74±1.40
End of Week 1	5.30±1.21	5.53±1.15	5.42±1.18
End of Week 6	5.38±1.19	5.77±0.98	5.57±1.11
Change in PACES scores			
Baseline to End of Week 1	0.48±1.41	0.86±1.39	0.67±1.41
Baseline to End of Week 6	0.56±1.20	1.15±1.53	0.85±1.39

Mean±SD. Scores range from 1-7 with higher scores indicating greater enjoyment.

eTable 9. Patient Satisfaction Questionnaire Scores

	Telerehabilitation	**In-Clinic**	**p**
End of treatment week 1	52.6±8.8	56.6±7.4	0.012
End of treatment week 6	55.2±7.7	58.5±8.0	0.015
Change over time	2.6±8.1	2.0±7.2	0.68

Mean±SD. Scores range from 10 to 70, with higher values reflecting greater satisfaction with treatment. Wilcoxon signed rank testing.

eTable 10. Additional Evaluation Method for Assessing Non-Inferiority

Model	**Estimate**	**Std. Error**	**95% CI**	**P**
ITT with multiple imputation of missing 30-day follow-up scores	2.38	0.96	(0.50, 4.26)	0.013
ITT complete case	2.32	0.97	(0.40, 4.24)	0.017
PP complete case	2.17	0.96	(0.26, 4.08)	0.024
ITT with "worst-best-case" substitutions for missing 30-day follow-up scores	2.24	0.91	(0.44, 4.04)	0.014

Estimated difference comparing the mean Fugl-Meyer change scores (baseline to 30-day follow-up visit) for TR subjects to the mean of 70% of Fugl-Meyer change scores for IC subjects.

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