Rapid Transition to Telehealth Group Exercise and Functional Assessments in Response to COVID-19

Supplementary Material

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*Protocols for the VA specific VCM platform can be obtained from the corresponding author
Detailed Protocol for Remote Physical Performance Assessment

**Tester needs:** A folding chair (17in), stopwatch, tape measure, masking tape or colored tape, clipboard, pencil/pen, & physical function datasheet.

**Prior to physical assessment:**
Gather most recent height, weight and bp from the patients CPRS record. Denote time these measurements were taken. Be sure to enter that into the database. Prior to the testing appointment, have the participants gather his/her dumbbells or weighted items (water jug, canvas bag, etc) and chair. Ask the participant to position the chair within full view of the instructor and against a surface that would not move during testing (i.e. wall).

**VITAL SIGNS**

BP: ____/______  WEIGHT: _________  HEIGHT: __________

**Fall Questions:**
(Ask at each assessment) Fear of falling? Yes □  No □

(Ask at all follow-up assessments) Fallen since last assessment? Yes  □ No  □ If yes, number of falls / date(s) ______________________

**ED Visits and Hospitalizations:** (These questions are asked at each follow-up assessment. Record only VA visits.)

1. Have you been to the emergency department since your last assessment?
2. If yes, how many times?
3. Do you know the dates? (you’ll verify this information in CPRS so it might be helpful to know an approximate time.)
4. What was your reason for going?
5. Were you admitted? Or sent home?

1. Have you been hospitalized since your last assessment?
2. If yes, how many times?
3. Do you know the dates? (you’ll verify this information in CPRS so it might be helpful to know an approximate time.)
4. What was your diagnosis?
5. Disposition? Sent home, rehab, family care, Hospice?

**Before starting the functional assessment, I’d like you to warm-up for about 5 minutes to get your muscles ready.** (Use Si-fit, ride stationary bike or walk on treadmill for about 5 minutes at easy pace)
Explain procedure: You are going to do series of tasks that will help us understand how you function physically. There are tasks that represent different components of fitness you might typically do throughout the day, like walking or getting out of a chair. The entire procedure will take about 15 minutes.

Task #1 Arm Curl (Modified from Rikli & Jones Senior Fitness Test)

The first task is the Arm Curl. It measures your upper body strength. Decide which of your arms are stronger. You are going to do as many curls as you possibly can in 30 seconds using your full range of movement. Hold the dumbbell in a handshake grip at your side, palm facing your body. Curl your arm while rotating your palm towards your chest. Using the screen share option on the VCM telehealth application (or whatever telehealth application being used), show images depicting the correct positioning (knees shoulder width apart, sitting all the way back in the chair, etc.) of an arm curl test. Realistically the patient will not have an 8 lb weight at home, for these patients use an 8 lb unopened 1 gallon jug of water (brand is irrelevant).

To accommodate the potential for varying lag times on the virtual call, start the timer upon initiation of movement. Stop the watch at the 30 second mark after the first motion, with successful repetitions counted and scored on a data sheet.

Let’s practice once. Keep your hand on the patient’s bicep to feel for a full range of motion of lower arm.

Do you have any questions?

Ready, set, go.

Halfway into the task prompt: “as fast as you can”. More than halfway up at the end of 30 seconds counts as a full curl. Use 8-pound dumbbell for men and a 5-pound dumbbell for women. Note which arm was used.

R   L
TASK #2  Chair Rise Task (Repeated Chair Stand) (Modified from Rikli & Jones Senior Fitness Test)

(BRACE CHAIR – ARMS BEHIND/AROUND PATIENT)

*Always use the same chair for this test*  * Have participant move chair against a sturdy unmoving surface*

The next task is the Chair Stand, which measures your lower body strength. For this task, you are going to sit in the middle of the chair, bend your knees to a 90-degree angle with your feet flat on the floor (and hip/shoulder width apart), and arms across your chest. With your arms across your chest, you are going to get up and down as many times as you can as fast as you can for 30 seconds.

Using the screen share option on the VCM telehealth application (or whatever telehealth application being used), show images depicting the correct positioning (knees shoulder width apart, sitting all the way back in the chair, etc.) of a chair stand test.

To accommodate the potential for varying lag times on the virtual call, start the timer upon initiation of movement. Stop the watch at the 30 second mark after the first motion, with successful repetitions counted and scored on a data sheet.

Note to tester: We will collect two scores in this one test. The first is the number of seconds it takes to complete 5 stands, and the second is the number of stands completed in 30 seconds. Repetitions are counted at the top of the motion (standing position). See instructions for scoring Time to 5 below.

Let’s practice once. *(Never have them do more than one practice stand; if a correction needs to be demonstrated you should do it for them.)* Support the chair against the wall and correct performance.

Remember, you must stand up all the way as well as sit down completely for the repetition to count.

Any questions? Remember, do it as fast as you can.

Ready, set, go. *(COUNT OUT LOUD)*

Halfway into the task prompt: “as fast as you can”. *(say it loudly because sometime patients think you are telling them to stop and they hesitate. Scoring: Score the total number of stands completed in 30 seconds. More than halfway up at the end of 30 seconds counts as a full stand. Brace chair….STOP if there is pain.*

You can stop the test if you observe the participant is no longer able to perform additional stands.

Adaptation:

If participants cannot perform even one stand with arms crossed on the chest, allow them to use their hands to push off their legs or the chair, or use a cane or walker, or use a higher or lower seat. Describe the exact adaptation on the datasheet. When adaptations are used, the recorded test score is zero *(and
zero is what is entered in the database). You can use the adaptive score (record on datasheet but not in DB) to compare personal performance on future assessments. The goal is to eventually use the test protocol as written, which doesn’t allow using hands to press off or other adaptations

**Time to 5 scoring:**
You will begin the timer on “go” and count each repetition when the participant stands fully upright. Double click the start/stop function of the stopwatch when participant is fully upright at the top of the 5th full stand. Continue to count repetitions for the remaining 30 seconds. If, at 30 seconds, the participant has not completed 5 stands and they are still attempting to do so, allow them to continue for an additional 30 seconds. Note the total number of stands at 30 seconds as you continue to count to 60 seconds. Stop the test when they reach 5 stands or when 60 seconds has elapsed, whichever comes first. If the participant is unable to complete 5 stands in 60 seconds, make a slash on the datasheet. You cannot enter zero in the Time to 5 field in the database because of the auto calculation of the field. Instead, when entering the data, leave the time to 5 field blank, check that the test was completed, and enter a comment in the comment section.

**TASK # 3 (2-minute step test) (Modified from Rikli & Jones Senior Fitness Test)**

The last task we are going to do is called the 2-minute step test. This task will measure your endurance. Your goal is to raise your knees up above the point as many times as you can in 2 minutes. I will give you prompts every minute and at the last 30 seconds. I will tell you “1 minute down, 30 seconds remaining, so you can judge how much time you have left. If you start out too fast you can slow down, or stop and rest, but the clock will keep going. If you need to sit down, the task is over. If you feel like you need help with your balance, then you may hold onto the chair. (denote on form if patient holds chair).

For this task we are going to measure a line on your wall. Let’s use a piece of painters tape or something that will be easy to spot yet will not damage wall. Try to place the tape halfway up your leg between your knee and hip.

Using the screen share option on the VCM telehealth application (or whatever telehealth application being used), show images depicting the correct positioning (standing between the chair and the wall with the camera positioned alongside the participant) of the 2 minute step test.

To accommodate the potential for varying lag times on the virtual call, start the timer upon initiation of movement. Stop the watch at the 2-minute mark after the first motion, with successful repetitions of the right knee reaching correct height counted and scored on a data sheet.

Do you have any questions?

**READY. SET. GO. Be sure to start the timer on GO.**
At 1 minute down check to see “1 minute down, 1 minute to go, how are you doing?” “Remember do the best that you can”

Don’t stop abruptly. At the end of 2 minutes tell them to slow down but keep walking, you can tell them the task is over, but you want them to cool down. Offer positive feedback.

Cool-down: walk slowly for a minute or two. Scoring: Record the number of times that the right knee came above the tape line.

**Review of Results:**

Upon completion of the physical testing and after the cool-down, the instructor should administer the questionnaires, review the results of the functional assessments and discuss how to address impairments with exercise.
### GeroFit VOD

**Physical Function and Outcomes Datasheet**

| Test Timepoint | Test Date | Age at Testing | Blood Pressure | Waist Circumference | Weight | Height | Fear of Falling | Fallen since last Assessment | # of Falls (If YES) | Date of Falls (If YES) |
|----------------|-----------|----------------|----------------|---------------------|--------|--------|----------------|----------------------------|-------------------|-----------------------|
| Baseline       |           |                |                |                     |        |        |                |                            |                   |                       |
| 3-Month        |           |                |                |                     |        |        |                |                            |                   |                       |
| 6-Month        |           |                |                |                     |        |        |                |                            |                   |                       |
| 12-Month       |           |                |                |                     |        |        |                |                            |                   |                       |
| 2-Year         |           |                |                |                     |        |        |                |                            |                   |                       |

### ED Visits

| Test | ED Visits | ED Visits Dates | ED Visits | ED Visits Dates | Hospitalizations | Hospitalizations Dates | Hospitalizations | Hospitalizations Dates | Hospitalizations |
|------|-----------|-----------------|-----------|-----------------|-------------------|------------------------|------------------|------------------------|------------------|
| 3-Month | Yes ☐ No ☐ | 1 2 3 4 | 1 2 3 4 | Yes ☐ No ☐ | 1 2 3 | Yes ☐ No ☐ | 1 2 3 | Yes ☐ No ☐ | 1 2 3 4 |
| 6-Month | Yes ☐ No ☐ | 1 2 3 4 | 1 2 3 4 | Yes ☐ No ☐ | 1 2 3 | Yes ☐ No ☐ | 1 2 3 | Yes ☐ No ☐ | 1 2 3 4 |
| 12-Month | Yes ☐ No ☐ | 1 2 3 4 | 1 2 3 4 | Yes ☐ No ☐ | 1 2 3 | Yes ☐ No ☐ | 1 2 3 | Yes ☐ No ☐ | 1 2 3 4 |
| 2-Year | Yes ☐ No ☐ | 1 2 3 4 | 1 2 3 4 | Yes ☐ No ☐ | 1 2 3 | Yes ☐ No ☐ | 1 2 3 | Yes ☐ No ☐ | 1 2 3 4 |

*Key for hospital disposition: ☐ Home ☐ SNF ☐ Rehab ☐ Hospice ☐ Family

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**Warm-up**
| Test Item                  | Test Wave | Raw Score | At Risk (<0.7m/sec) | Below Average (<1.0m/sec) | Normal Range (>1.0m/sec) | Above Average >1.2 |
|---------------------------|-----------|-----------|---------------------|---------------------------|--------------------------|-------------------|
|                           |           | Average   | Today               | Yesterday                 | 2 Days ago               | 3 days ago        | 4 days ago        | 5 days ago        | 6 days ago        | 7 day ago         |
| Step Recall               | Baseline  |           |                     |                           |                          |                   |                   |                   |                   |                   |
| Visually Confirm          | Baseline  |           |                     |                           |                          |                   |                   |                   |                   |                   |
| Measurements through     | 3-Month   |           |                     |                           |                          |                   |                   |                   |                   |                   |
| VOD                       | 6-Month   |           |                     |                           |                          |                   |                   |                   |                   |                   |
|                           | 12-Month  |           |                     |                           |                          |                   |                   |                   |                   |                   |
|                           | 2-Year     |           |                     |                           |                          |                   |                   |                   |                   |                   |
| Arm Curl (Number of curls | Baseline  | R          |                     |                           |                          |                   |                   |                   |                   |                   |
| completed in :U sec)     | 3-Month   | L          |                     |                           |                          |                   |                   |                   |                   |                   |
| Females: 5 pounds         | 6-Month   | R          |                     |                           |                          |                   |                   |                   |                   |                   |
| Males: 8 pound            | 12-Month  | L          |                     |                           |                          |                   |                   |                   |                   |                   |
|                           | 2-Year     | R          |                     |                           |                          |                   |                   |                   |                   |                   |
| Chair Stand              | Baseline  |           |                     |                           |                          |                   |                   |                   |                   |                   |
| # of seconds              | 3-Month   |           |                     |                           |                          |                   |                   |                   |                   |                   |
| to complete five stands  | 6-Month   |           |                     |                           |                          |                   |                   |                   |                   |                   |
| completed in 30 seconds   | 12-Month  |           |                     |                           |                          |                   |                   |                   |                   |                   |
|                           | 2-Year     |           |                     |                           |                          |                   |                   |                   |                   |                   |
| 2 Minute Step Test        | Baseline  |           |                     |                           |                          |                   |                   |                   |                   |                   |
| (# of times right knee    | 3-Month   |           |                     |                           |                          |                   |                   |                   |                   |                   |
| goes above tape)          | 6-Month   |           |                     |                           |                          |                   |                   |                   |                   |                   |
|                           | 12-Month  |           |                     |                           |                          |                   |                   |                   |                   |                   |
|                           | 2-Year     |           |                     |                           |                          |                   |                   |                   |                   |                   |
Visual Guide for Remote Physical Performance Assessment

Visuals For Chair Stand Test

Sit half-way up on the chair
Your arms should be across your chest

Your knees and feet should be shoulder width apart
You need to stand up entirely for the movement to count.

If you do not stand all the way up the tester will not count the rep.
You need to sit entirely down for the movement to count

If you do not sit all the way down the tester will not count the rep
With the testers help mark the wall opposite the chair with some form of tape that is equal with halfway between your knee and hip

Stand between yourself and the chair, for optional balance if needed
For repetition to count both knees need to reach above marked tape. I will give you prompts to raise your knee if it drops below the tape while marching.
You will march alternating legs for 2 minutes. If you need to rest, you may but the timer will continue.

I will give you updates on your time, (1 minute down & 1 to go, final 30 seconds. etc.)
To start I need your hand in a handshake grip. Choose whatever arm you feel is stronger.
Have your feet about shoulder width apart and your back to the chair.
Rotate the weight as you come up.
For the repetition to count, I need you to come all the way up, rotating as you come up.
You have 30 seconds to do as many as you can, I will count out loud the number.

Likewise, the repetition will not count unless you come completely back down.
Supplementary Text S3

Physical Activity and Global Health Questionnaires

VAID: _____________   Date:   _______________      Test Timepoint___________

Physical Activity   (Note to tester: Do not include at Baseline; responses come from consult)

Think about BOTH the exercise you do **in Gerofit** AND the exercise you do **outside of Gerofit**:

1. On average, how many days per week do you engage in at least moderate cardio exercise
   (like a brisk walk)? _____ number of days
   1.a. On average, how many minutes per day do you engage in exercise at this level?
       ___ ___ minutes

2. Are you currently doing any strengthening exercises (like lifting weights or doing push-ups)? Yes / no
   2.a. If yes, on average, how many days per week do you engage in strengthening exercises?
       _____ number of days On average, how many minutes per day do you engage in exercise at this level?
       ___ ___ minutes
# Global Health Scale

| Please respond to each item by checking one box per row | Excellent | Very good | Good | Fair | Poor |
|---------------------------------------------------------|-----------|-----------|------|------|------|
| 1. In general, would you say your health is:           |           |           |      |      |      |
| 2. In general, would you say your quality of life is:  |           |           |      |      |      |
| 3. In general, how would you rate your physical health?|           |           |      |      |      |
| 4. In general, how would you rate your mental health, including your mood and your ability to think? |           |           |      |      |      |
| 5. In general, how would you rate your satisfaction with your social activities and relationships? |           |           |      |      |      |
| 6. In general, please rate how well you carry out your usual social activities and roles. (This includes activities at home, at work and in your community, and responsibilities as a parent, child, spouse, employee, friend, etc.) |           |           |      |      |      |

| Please respond by checking one box | Completely | Mostly | Moderately | A Little | Not At All |
|-----------------------------------|------------|--------|------------|----------|------------|
| 7. To what extent are you able to carry out your everyday physical activities such as walking, climbing stairs, carrying groceries, or moving a chair? |           |        |            |          |            |

**In the past 7 days**

| In the past 7 days | Never | Rarely | Sometimes | Often | Always |
|--------------------|-------|--------|-----------|-------|--------|
| 8. How often have you been bothered by emotional problems such as feeling anxious, depressed or irritable? |       |        |          |       |        |

**In the past 7 days**

| In the past 7 days | None | Mild | Moderate | Severe | Very Severe |
|--------------------|------|------|----------|--------|-------------|
| 9. How would you rate your fatigue on average? | |

| In the past 7 days | | | | | |
|--------------------| | | | | |
| 10. How would you rate your pain on average? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

| In the past 7 days | No Pain | Worst Imaginable Pain |
|--------------------|-------|--------------------|
| 10. |       |                    |

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Supplementary Text S4

Gerofit-to-Home Exercise Session Example

30-minute Routine

This exercise routine will not be appropriate for all veterans, certain veterans will need to remain seated the entire time, while others will not find it challenging enough. Use your judgement as an exercise professional to modify and change the base movements. In addition, these exercises total more than 30 minutes if done to their entirety. Ideally, the session will last 30 minutes. Feel free to change up routine to a certain extent to avoid boredom.

A. Warm up/ Aerobic Component 1 (5 minutes)
   1. Marching in place
   2. Side Twists
   3. Chicken Wing Twists (Hold Left Side, Hold Right Side)
   4. Overhead Swimming (*Modified to lower flexion swimming)
   5. High Knees
   6. Butt Kicks
   7. Side Steps
   8. Side Twists
   9. Hip Circles
   10. Shoulder Shrugs (10 forward, 10 back)
   11. Arm Circles Forward
   12. Arm Circles Backward
   13. Roll the hips out
   14. Big circle, deep breath, arch back and end.

B. Floor/ Chair Class (20-25 minutes)

1. In Chair
   i. Reach straight out, hands together abdominals braced-exhale with each reach (about 20 reps)
   ii. Up- Downs) (4-5 reps, hold last one)-Legs straight, hands on side of chair to pick hips up and return down
   iii. Alternate Straight Leg Raise Stretch- One knee bent with foot on floor, hands under other knee holding straight leg up (± 3 reps each leg)
   iv. Bottom Lifts (Lift single leg at a time holding straight and bracing ab muscles) (5-6 reps)
v. Pretzel Twist (Side to side) (2-3 reps each side) Legs to one side of the chair, knees together and look back opposite way. At last one- straighten out top leg to the side
vi. Straighten-out one leg, pull other knee to chest (+ 2 reps each leg)
vii. Hug Both Knees (pull legs to chest together, rock side to side gently on one of these) (2-3)

2. Aerobic Component
   i. Marching (side to side step for the lower intensity portion, followed by full upright marching for the moderate to vigorous portion) (The vigorous portion should be a 5-6 on the RPE scale).
      1. Balanced impaired or extreme deconditioned Veterans may do this from the chair.
      2. Aim for 30 seconds of moderate to vigorous followed by 30 to 45 seconds of low side to side stepping.
      3. Aim for several sets, ideally 3 to 4.

3. Resistance Training Component
   i. Chair Stands (rise up from the chair and return back to seated position) (10 to 12 reps * based on ability) (on last rep remain standing)
      1. Modification: use a pillow on the chair or use a chair in front and help push up using the chair).
   ii. Wall Pushups (have the Veteran find a spot on their wall within view of the camera and lower themselves down to the wall and return to the starting position). (10 to 20 reps)
      1. Modifications:
         a. If this is too easy try backing their feet farther away from the wall.
         b. If this is extremely easy try using a solid item that will not move such as a large couch or table where the angle will be greater.
         c. If this is too difficult have the Veteran isometrically contract their arms as if they have a watermelon between their arms. They should hold the pose for the duration of the repetition.
   iii. Toe Raises (holding onto the chair focus on going all the way up and all the way back down on your toes)
      1. Modifications
         a. If this is too easy try having the Veteran use one foot with the other foot hovering about an inch off the ground
         b. If this is extremely easy for the Veteran try using one foot and focus on a 5-step process (flat feet, balls of your feet, on your toes, balls of your feet, down, repeat).
c. If this is too hard for your Vets or if balance is an issue, try having the vet go up on their toes while remaining seated.

iv. Banded pull apart (reverse fly) (10 to 12 reps)
   1. If this hurts have the Veteran avoid this exercise

v. Banded Bicep Curls (have the Veteran loop the band underneath their feet and bring the band up with their elbows locked in) (10 to 12 reps)

vi. Standing Band walks (looping the band underneath your feet criss-cross the band with opposite arms, standing up straight move laterally 2 steps in each direction) (10 to 12 reps).

vii. Elbow Flexion with Shoulder Retraction (Resembles a bow and arrow) (Have the veteran raise one arm up as if holding the bow and retract the elbow of the opposite arm, as if retracting the bow) (10 to 12 reps each side)

viii. Unilateral Tricep Pull Down (Have the Veteran hold the band on one side in the center of the chest while the other arm pulls downward the band while keeping the elbows locked in) (10 to 12 reps each side).

ix. Seated Bent Over Banded Rows (seated have one leg fully extended and keeping your back straight retract shoulder blades) (10 to 12 reps) (foot used is irrelevant)

4. Standing Behind Chair
   i. Alternating Straight Leg Lifts (± 6-8 reps each leg)- Hold chair with both hands, extend hip back
   ii. Alternating Bent Leg Lifts (± 6-8 reps each leg) bend knee then extend hip back
   iii. Alternating Arms Out in Front Lifts (± 3-4 reps each arm)-arms at shoulder height raise one overhead, keep other at shoulder height
   iv. Opposite arms and leg lifts, alternating (± 3-4 reps each side)-One hand on chair raise opposite sides
   v. Back Arch – on Elbows--stretch (about 2 reps)- Hold one hand with other behind back, squeeze shoulders together, look towards ceiling
   vi. Back Arch – Arms in Back, Lift and Strengthen (about 2 reps)-Arms by your side, tuck chin, shoulders squeeze together

5. Seated in Chair
   i. (Arch up an Sag Back) (± 3-4 reps)-On arch-chin to your chest, legs straight, arms reach forward, on sag-relax back, look toward ceiling, arms fall backwards
   ii. Wag the Tail-Shift hips in chair
   iii. Sit Back on Heels and Stretch Spine to the left and right at the end (hold for 30-40 seconds)
   iv. Torso Rotation- Arms at shoulder height-Let one arm turn to the side as your eyes follow that hand, meet back together and switch
C. **Cool Down Flexibility Component**
   1. **Standing with chair assistance**
      i. Leg Swing-Hip abduction and adduction-8 per side
      ii. Hip Flexion/Extension-8 per side
      iii. Foot on Chair/Block hamstring stretch-Leg on chair stays straight
      iv. Turn Ankle in and out from hamstring stretch
      v. Foot flat on chair- Hip flexor stretch, move deeper for quad stretch
      vi. Side of foot on chair for inner thigh/piriformis stretch
      vii. Shoulder Stretch, each side, thumbs down
      viii. Triceps Stretch, scratch the back, each side
      ix. Back flexion stretches holding chair
Supplementary Text S5

**Training Video for Physical Performance Testing**

https://www.youtube.com/watch?v=sj0StWSoRzk&feature=youtu.be
Supplementary Text S6

10-Point Effort Scale

0  Sitting – No Movement

1

2

3

4

5  Moderate Intensity Effort → Endurance Exercises
   (Walking)

6

7  High Intensity Effort → Weight Lifting

8

9

10  All – Out Effort
Supplementary Figure S1

Figure 1: Baseline, 3 and 6 month functional outcomes following 1 X week VCM - Facilitated Exercise (n=4) with remote functional assessments