	Title:	Hand Grip Strength		
	Version Date:	2016-APR-18	Document Number:	SOP_DCS_0028
	Effective Date:	2016-MAY-31		
Data Collection Site (DCS)	Version:	2.2	Number of Pages:	5

1.0 Purpose:

The purpose of this document is to describe the standardized procedure for measuring participants' grip strength.

2.0 Scope:

This document is to be used by DCS staff to guide the administration of the hand grip strength test to participants.

3.0 Responsibilities:

DCS staff are responsible for performing the procedures as described in the current and approved version of the standard operating procedure.

4.0 Related Documents:

Not applicable

5.0 Definitions:

- **Dynamometer:** a device used to measure hand grip strength

6.0 Equipment:

- Tracker Freedom Wireless Grip dynamometer

7.0 Supplies:

- Chair with no arm rests
- Disinfectant wipe or alcohol wipe







8.0 Procedure Steps:

Contraindications:

- Surgery on both hands or wrists within the last 3 months (Contraindications Questionnaire);
 - Pain or paralyses in both hands or wrists due to arthritis, tendinitis, carpal tunnel syndrome (Contraindications Questionnaire);
 - Cast on both arms or hands (Contraindications Questionnaire);
 - Open sores, wounds or bruising on both hands (Contraindications Questionnaire); or,
 - Prosthetic arms, hands or fingers on both sides (Contraindications Questionnaire).
- NOTE:** Charge the Hand Grip overnight or over a weekend and unplug from the charger at the start of every business day. Do not charge over long periods of

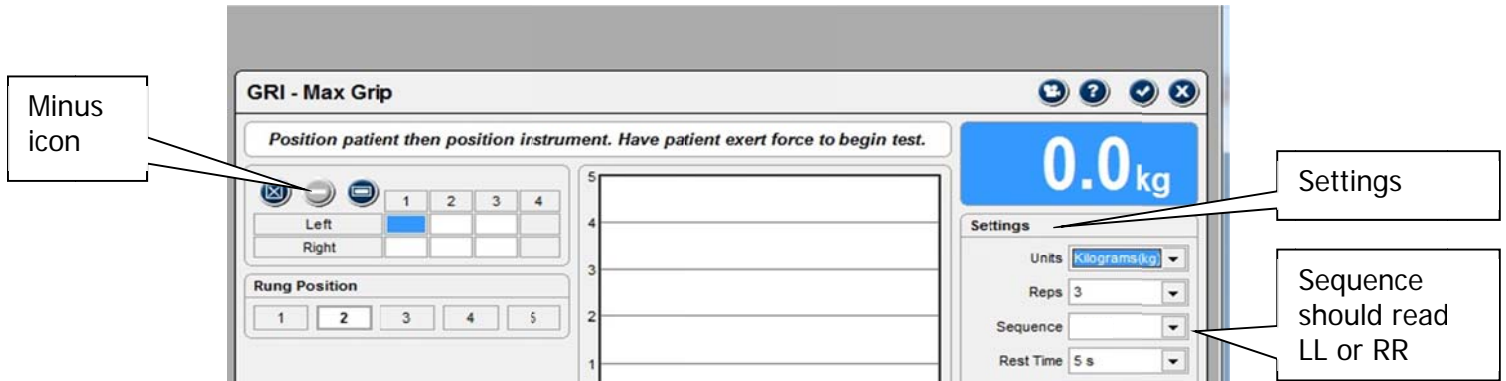
time, like during the December break, as this could reduce the overall life of the battery.

Important: Positioning/placement of the participant is critical to ensure the reproducibility and comparison of this test between visits. Critical steps marked with 

- Step 1:** At the *Interview Tab* in Onyx, look for Hand Grip Strength in the list of stages. Then select **Start** in that row.
- Step 2:** The “Grip Strength: Start” window will pop up.
- Step 3:** **Scan** the Participant ID barcode, click on **Continue**.
- Step 4:** In Onyx answer “Is the dominant hand used for the test” by asking the participant to identify his/her dominant hand. The **dominant** hand will be used for the test, unless it is contraindicated. A note will appear in this stage if one hand is contraindicated.
- Step 5:** Click on the **Start** button to start the Grip Strength software.
- Step 6:** In the Grip Strength software, choose **Perform Exam**, click **CLSA** in the three windows, then **OK**. Choose **Instrumented**  then choose the **Handgrip Icon**  in the top left, click **Max Grip** and then click on the **Play Icon**  in the left bottom corner.
- Step 7:** The Device Wake-Up window opens. Unplug the device and press the **ON** button at the top of the device, see picture below.









- Step 8:** If the device needs to be Zeroed, click on **Zero**, and then **OK**. To avoid having to do this for each participant, open the Grip Strength (GRI) software in the morning without logging into Onyx and follow Steps 6 to 8.
NOTE: Always delete the previous measurements by clicking the blue **'Minus'** icon (Shown below). This can also be used to delete erroneous tests by highlighting them and using the minus icon.



Step 9: Be sure the settings are set as shown above:

- Units – Kilograms
- Reps – **3**
- Sequence: LL: if the dominant hand is Left.
RR: if the dominant hand is Right.
- Rest Time – 15s
- Threshold – 5.0 kg
- Primary Stat – Maximum
- Normal Type – Mathiowetz

Step 10: Instruct the participant to assume the proper position, which is as follows:

-  Sit in a straight-backed chair
-  Feet flat on the floor
-  Arms close to the body and shoulders relaxed
-  Arms unsupported
-  Forearm rotation neutral
-  Elbow flexed at 90-degree with the hand in a neutral position



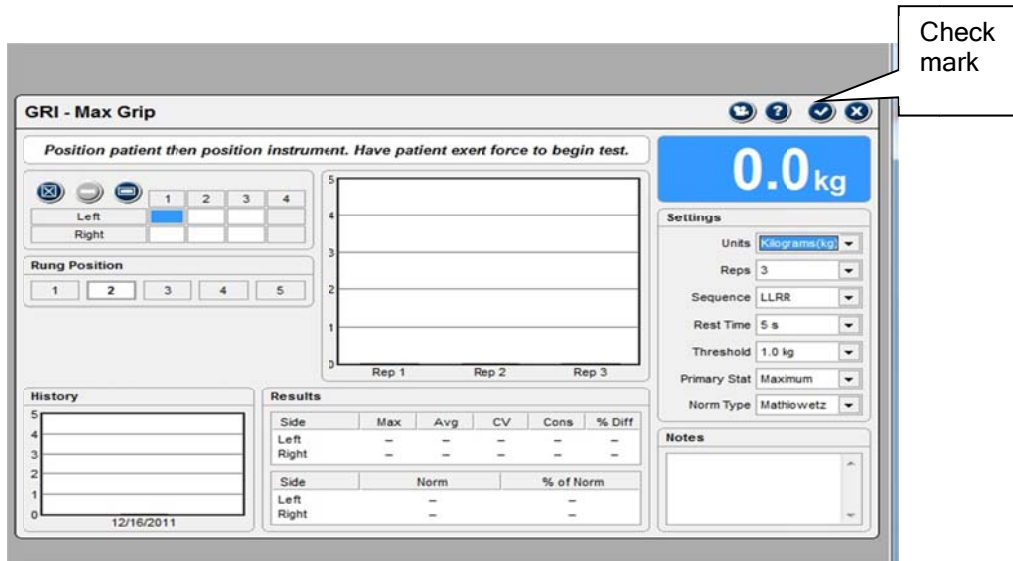
Step 11: Explain the procedure in full and demonstrate the test and the use of the dynamometer to the participant. Hand the dynamometer to the participant (to the dominant hand). Ask the participant to support the device by resting it on the non-dominant hand, which must be positioned hand open and flat, palm side up, with the battery on the bottom - see picture below. Allow the participant one practice trial before conducting the test.



Step 12: **Instruct** the participant to **Squeeze** the dynamometer with as much force as possible. Caution the participant to squeeze only once for each measurement.

Step 13: Repeat **Steps 11-12** two more times, for a total of three trials. Allow a rest period of 15 seconds between trials to avoid muscle fatigue.

The result of each trial will be automatically recorded in Onyx.



Step 14: Click the **Check Mark** in the right top corner. The conclusion screen will appear and indicate that you have completed the measurements.

Step 15: The software must be closed now by clicking the **X** in the far right corner of the Grip Strength software.

Step 16: In Onyx, press **Refresh**, and the three measurements will appear, click **Next**.

Step 17: Click **Finish**, "The Hand Grip Strength: Finish" window will pop up.

Step 18: Indicate in the **comment** field in Onyx if there was anything that may have affected or influenced the measurement. Ensure that comments do not contain any personally identifying information.

Step 19: Click **Continue** to return to the status page.

Step 20: Wipe the handgrip with a disinfectant or alcohol wipe.

9.0 Documentation and Forms:



- **CRF_DCS_0028** - Grip Strength Case Report Form

10.0 References:

- Hand Grip Strength Protocol [revised: 09/03]. Tufts University Nutrition Collaborative – Center for Drug Abuse and AIDS Research (TNC-CDAAR). Available from: <http://cdaar.tufts.edu/protocols/Handgrip.pdf>

- Timed Walk and Hand Grip Strength Protocol [last updated: 2008 Oct 30]. The Multicenter AIDS Cohort Study (MACS). Available from: <http://www.statepi.jhsph.edu/macs/Questionnaires/Guidelines/v50guide-frailty.pdf>
- Ashton LA, Myers S. Serial grip strength testing – Its role in assessment of wrist and hand disability. The Internet Journal of Surgery. 2004; 5(2).

Baseline Revision History:

New Version #	Revision Date	Revision Author	Content Approval
2.2	2016-APR-18	Lorraine Moss	Mark Oremus
Summary of Revisions			
Added "Disinfectant wipe or alcohol wipe" to the list of supplies.			
Added Step 20 : Wipe the handgrip with a disinfectant or alcohol wipe.			
New Version #	Revision Date	Revision Author	Content Approval
2.1	2014-AUG-20	Lorraine Moss	Mark Oremus
Summary of Revisions			
Note added to CI: Important : Positioning/placement of the participant is critical to the reproducibility and comparison, between visits, for this test. Critical steps marked with 			
Added to Step 4 : A note will appear in this stage if one hand is contraindicated.			
Step 11 : Picture added and wording clarified: "Ask the participant to support the device by resting it on the non-dominant hand, which must be positioned hand open and flat, palm side up, with the battery on the bottom - see picture below."			
Removed sentence in Step 9 : You may need to adjust the threshold for a weaker person. The standard grip size is set for the second rung.			
Added stop signs to list in Step 10 for emphasis.			
Clarified wording of Scope, Purpose, and Responsibilities section.			
Updated SOP formatting.			
New Version #	Revision Date	Revision Author	Content Approval
2.0	2013-Jan-16	Lorraine Moss	Mark Oremus
Summary of Revisions			
Deleted "Validated stopwatch; and" from section 5.0			
Step 4 re-worded to read " Step 4 – In Onyx answer "Is the dominant hand used for the test" by asking the participant to identify his/her dominant hand. The dominant hand will be used for the test, unless it is contraindicated. "			
Added Step 5 to section 6.0			
Step 6 re-worded to read " Step 6 - In the software, choose Perform Exam ,..."			
Step 7 re-worded to read- The Device Wake-Up window opens. Unplug the device and press the ON button at the top of the device, See picture below.			
			
Step 8 re-worded to read - If the device needs to be Zeroed, click on Zero , and then OK . To avoid having to do this for each participant, open the software in the morning without logging into Onyx and follow steps 6 to 8.			
Added NOTE Under Step 8 "NB: Always delete the previous measurements by clicking the blue ' Minus ' icon (Shown above). This can also be used to delete erroneous tests by highlighting them and using the minus icon."			

Deleted from the end of **Step 9** "if the participant has a large hand and the grip needs to be moved to the third rung, move the location of the rung prior to measurement. Explain the procedure in full and demonstrate the test and the use of the dynamometer to the participant.

Onyx will have identified the dominant hand from the contra-indications questionnaire but to be sure to ask the participant to identify his/her dominant hand. The **dominant** hand will be used for the test, unless it is contraindicated. If the participant needs to use their non-dominant hand, make a note of this in the comments section."

Step 10 revised participant position to lay terms; arms close to the body and shoulders relaxed, elbow flexed at 90-degree with the hand in a neutral position

Step 11 re-worded to read "Explain the procedure in full and demonstrate the test and the use of the dynamometer to the participant. Hand the dynamometer to the participant (to the dominant hand). Ask the participant to support the device by resting it on the non-dominant hand; hand open and flat, palm side up. Allow the participant one practice trial before conducting the test.

Step 13 re-worded to read "Repeat steps 11-12 for 2 times, for a total of three trials. Allow a rest period of 15 seconds between trials to avoid muscle fatigue"

Step 14 re-worded to read "Click the **Check Mark** in the right top corner. The conclusion screen will appear indicating that you have completed the measurements."

Added note after section **6.0**

Added a Sequence comment to picture above **step 9**.

Various grammatical corrections throughout document.