clsa élcv Canadian Longitudinal Study on Aging Étude longitudinale canadienne sur le vieillissement	**Title:**	**Hand Grip Strength**		
	Version Date:	2019-SEP-26	**Document Number:**	SOP_DCS_0028
	Effective Date:	2019-NOV-15		
Data Collection Site (DCS)	**Version:**	2.4	**Number of Pages:**	4

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:
- **SOP_DCS_0047** – Tracker Grip Strength Machine SOP – Calibration and Maintenance

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**.

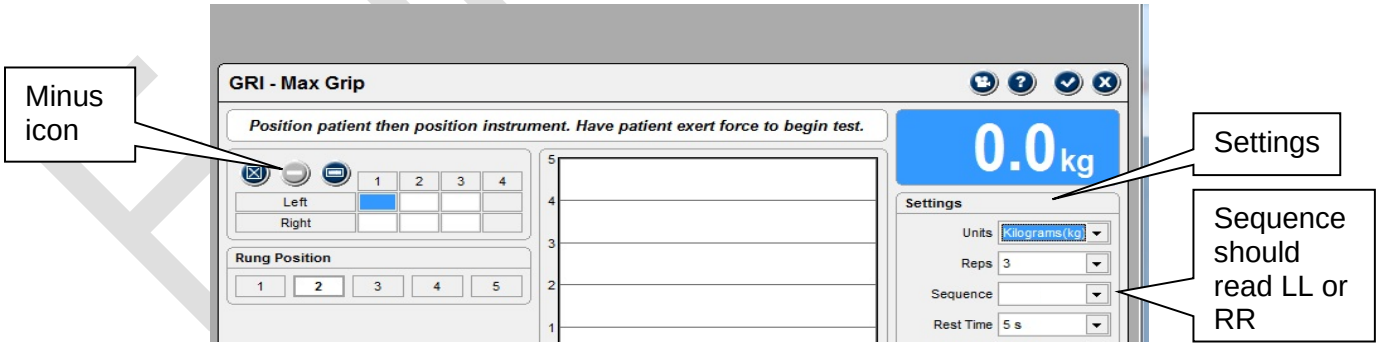
Step 4: In Onyx answer "Is the dominant hand used for the test" by asking the participant to identify his/her dominant hand. The **dominant** hand will be used for the test, unless it is contraindicated. A note will appear in this stage if one hand is contraindicated.

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

- Make sure rung position is set and matches the software. If not, reset the grip gauge or software default.

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

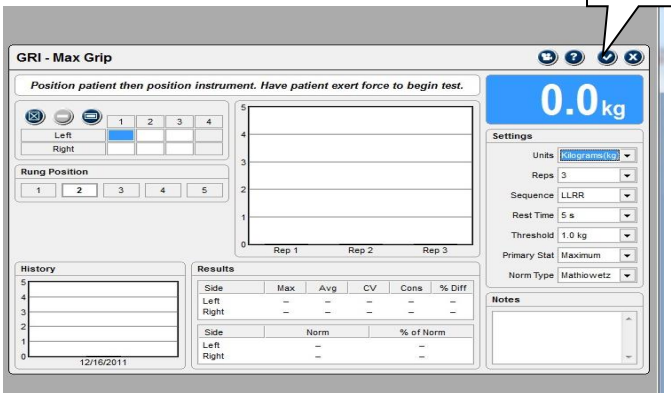
- Sit in a straight-backed chair
- Feet flat on the floor
- Arms close to the body and shoulders relaxed
- Arms unsupported
- Forearm rotation neutral
- Elbow flexed at 90-degree with the hand in a neutral position

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]. Tuffs 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).

F2 Revision History:

New Version #	Revision Date	Revision Author	Content Approval
2.4	2019-SEP-26	Lorraine Moss	Harriet Sauve
Summary of Revisions			
Updated formatting throughout document			
Added - Make sure rung position is set and matches the software. If not, reset the grip gauge or software default.			