

DOCUMENTATION

for

GAIT DATA

in

MIDUS REFRESHER
BIOMARKER PROJECT
(P4)

University of Wisconsin ♦ Institute on Aging
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INTRODUCTION

This document provides an overview of the gait data collected in the MIDUS Refresher baseline (MR1) Biomarker Project (P4) data. This document describes the gait protocol and measures. Administrative and computed variables are also identified and information about the construction and usage of these variables is included.

Data users are also encouraged to review the “MR1 P4 Biomarker Project Data File Notes”. This document provides information about naming conventions, as well as administrative and filter variables included in the data file. It also includes information about how we handled missing values and other issues that arose over the course of the study. For example, there are instances when variables were added or sections of an instrument were expanded for data entry purposes to accommodate additional information provided by the respondent.

This document will be periodically revised and updated as more information is gathered, and as researchers continue to work with the MIDUS Refresher Biomarker data. If there are suggestions or comments, please submit a message through the MIDUS HelpDesk (<http://midus.wisc.edu/helpdesk.php>).

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SECTION A: OVERVIEW OF DATA FILE AND COLLECTION PROTOCOLS

The MIDUS Biomarker Project (P4) assesses Gait using the APDM Mobility Lab System via 3 accelerometers attached at the ankles and lumbar spine. Data is streamed from the accelerometers to a dedicated laptop computer while participants walk back and forth at their usual pace along a straight 25-meter course for 2 minutes.

The gait assessment was added to the MIDUS Refresher as a pilot project conducted on at Site 2 (UW). The following describes the summary measures reported and the data collection protocol.

As described in the “MR1 P4 Biomarker Project Data File Notes”, naming convention organizes variables according to data type or the method used for data collection. Following this convention, the first four characters of the gait data are “RA4G”.

IMPORTANT NOTE

While processing data for M3, more was learned about the calculation of Gait measures by the APDM Mobility Lab System software at MR1. The most relevant development for the MR1 data is that the Cadence, Gait Cycle Time, and Double Support measures reported at MR1 do not represent averages of right and left side data as described below. Rather, all three measures report the right foot data as representative for both feet.

Researchers who wish to combine MR1 data with M3, please see the M3 Gait documentation for additional notes on changes to M3 Gait variables prompted by an APDM Mobility Lab software update in 2016. Please check any future data releases for similar information before attempting a data merge.

Data Documentation

Data about the following gait characteristics are collected for each gait cycle.

- Stride Length – the distance between two consecutive footfalls at the moments of initial contacts
- Stride Velocity – Walking speed
- Cadence – Stepping rate, overall
- Gait Cycle Time – Duration of a complete gait cycle in seconds
- Double Support – Percentage of a gait cycle that both feet are on the ground
- Swing – Percentage of a gait cycle that either foot is off the ground
- Stance – Average percentage of a gait cycle that either foot is on the ground

Note, height is not entered into the Mobility Lab software, thus, Stride Length and Stride Velocity are computed by the software as a % of stature/second.

Measures for most of the above characteristics are reported separately for the right and left side which are then averaged to create a final summary measure. The exceptions are Cadence, Gait Cycle Time, and Double Support which measure gait parameters that cannot be meaningfully

separated into right and left and thus only a final summary measure is reported for these two characteristics.

For all the above we report two summary measures:

- Mean – Average across all extracted gait cycles
- CoV – Coefficient of Variation calculated from all extracted gait cycles.

A flag variable (RA4GAVAIL) was also created and can be used to select the subset of cases for which gait data is available. This variable has the following codes:

- 1 = YES, Gait data available
- 2 = NO, Gait assessment could not be done due to technical difficulties
- 3 = R UNABLE TO DO, Participant unable to do assessment due to physical limitations/injuries.
- 9 = INAPP, Gait was only performed at UW. All Georgetown and UCLA cases are INAPP

The Gait data appear in the data file immediately after the musculoskeletal health data.

SECTION B: GAIT ASSESSMENT PROTOCOL

The following identifies the equipment needed and provides instructions for obtaining Gait data using the APDM Mobility Lab System.

The Gait protocol is generally completed after the Psychophysiology protocol, mid-morning, on Day 2 of the respondent visit. However, it can be conducted on Day 1 if time permits.

Materials Needed

1. Laptop with APDM *Mobility Lab* software
2. Three Opal Monitors (2-ankle, 1-back)



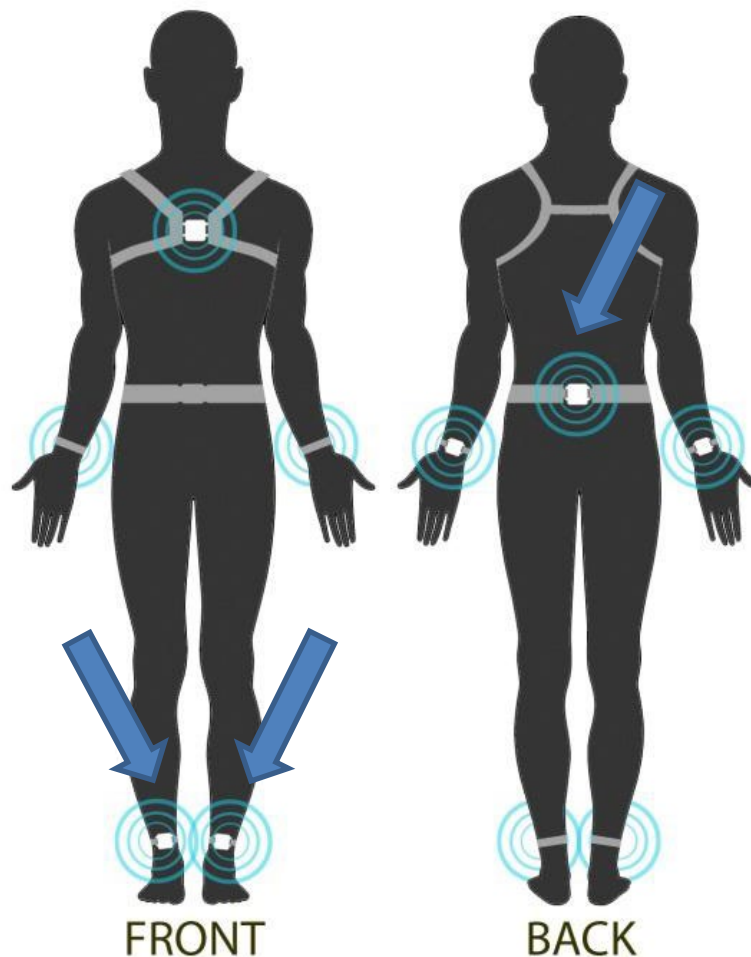
3. DOCKING STATION with USB (micro connector) and power cables
4. ACCESS POINT (wireless receiver) and USB (boxy Type-B connector) cable
5. Power source
6. Cart for transporting the Mobility Lab System and conducting Gait Analysis
7. USB/Jump drive for saving data.



PROTOCOL STEPS

Step 1: Placement of Opal Monitors

1. Remove the Opal Monitors from the DOCKING STATION. Confirm that the monitors are synchronized (i.e. blinking green in sync – this may take a few seconds) and that the ACCESS POINT is green, indicating a good signal.
2. Place the left leg monitor around the respondents left ankle (make sure that the green light is exposed and the USB port is on the bottom).
3. Place the right leg monitor around the respondent's right ankle (make sure that the green light is exposed and the USB port is on the bottom).
4. Place the lumbar monitor on the respondent's lower lumbar/back (make sure that the green light is exposed and the USB port is on the bottom).



Note: The order of monitor placement does not matter.

Step 2: Running the Timed Walk

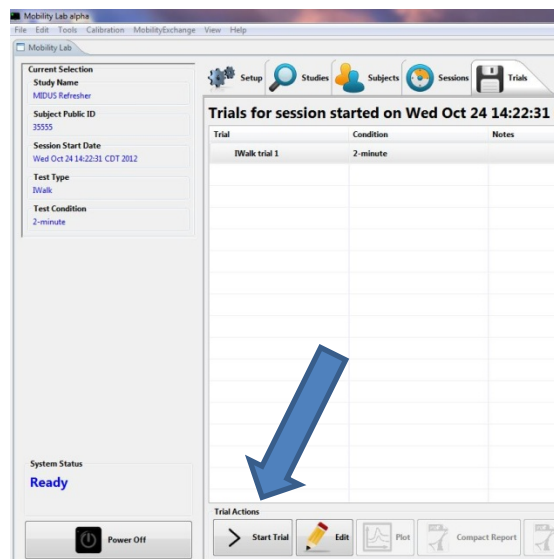
1. Show the respondent the starting and ending points of the 25-meter walking path, then ask him/her to stand at the starting point.



2. Speak the following out loud:

“When I say start, please walk at a natural and comfortable pace to the turning point. Once you have reached the end please turn around and return at the same pace. Continue to do this for 2 minutes. I will tell you when to stop.”

2. When the respondent is ready and standing at the starting point, select **Start Trial** from within the **Trials** tab.



3. Wait for the sensors to synchronize.
4. Click **Record** and tell the respondent to start walking.
5. At the end of the 2-minute trial period, ask the respondent to stop walking and select **Validate Data**. (If the data are not useable you will receive an error message. If so, redo the trial. If you do not get any errors, select **Keep and Exit**.)
6. Remove the monitors and allow the respondent to return to his/her room.