App Guide
Ground Reaction Force(GRF) Bilateral

SageMotion
Wearable Biofeedback System

sagemotion

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Components

Hub

Nodes *(8x)*

Battery

Node Straps: *Medium (8x), Short (4x), Long (2x)*

Cable A *(10x)*
-Connect Hub to Battery
-Charge Nodes & Battery

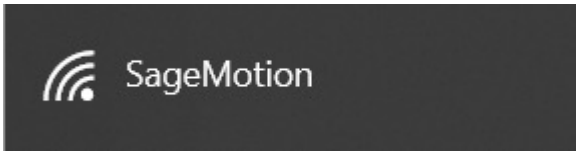
Cable B *(optional use)*
-Connect Hub to Computer

Node Charging Station

Wirelessly Connect to Computer or Cellphone

1) Connect Cable A to Battery and to Hub

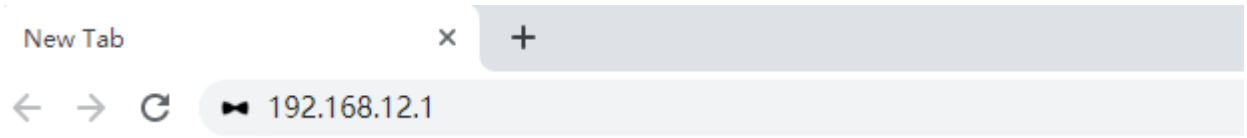
2) On Computer/Cellphone, Connect to Wi-Fi: “SageMotion”



Note 1: Need to wait for up to 1 minute for “SageMotion” to appear in Wi-Fi list. If it doesn’t appear, try turning the Wi-Fi off and then on again on the computer/cellphone.

Note 2: Hub is connected after clicking “Connect” even if in Windows it shows “Connecting” or “No internet, open”.

3) On Computer/Cellphone, in Chrome Address Bar, Go To http://192.168.12.1

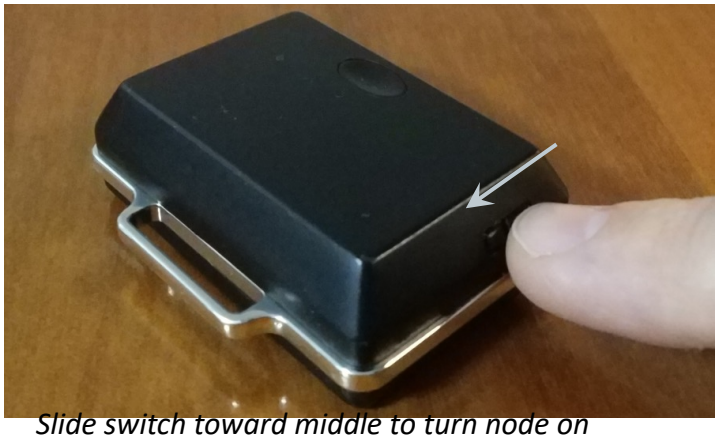


[Note] If Computer Doesn’t Have Wi-Fi: *plug in Cable B to the Hub and to the ethernet port of your computer, then in chrome address bar, go to* ***http://192.168.137.1***

GRF Bilateral App

The purpose of this GRF Bilateral app is to predict and stream Ground Reaction Forces (GRFs) in real-time based on IMUs data, facilitating the analysis of force distribution during various physical activities.

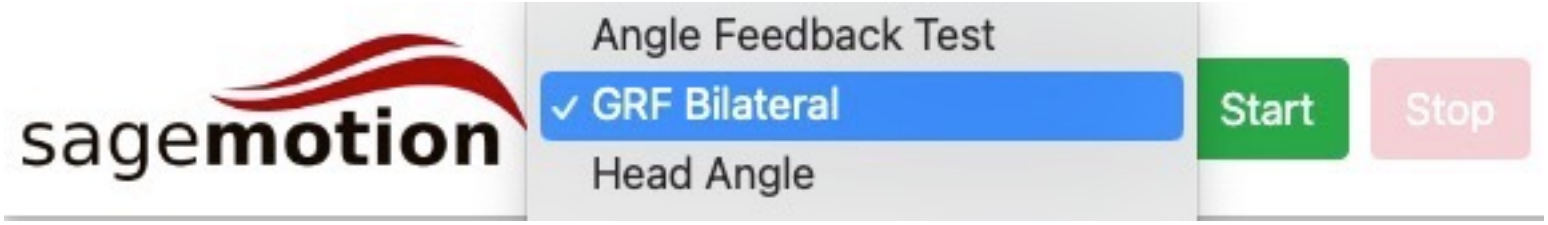
1) Turn on 7 Nodes



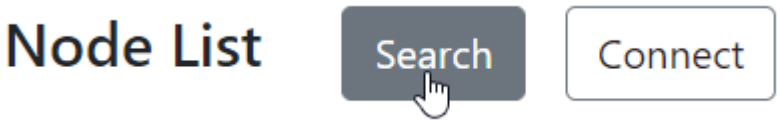
Slide switch toward middle to turn node on

Green light will blink after the node is on and running

2) Select “GRF Bilateral” App



3) Click “Search”



GRF Bilateral App *(cont.)*

4) Configure 7 Sensor Nodes as Shown Below:

Node List

Type	Position	MAC				
sensor	L_FOOT	18:04:ED:E7:83:4F	Blink	Vibrate		
sensor	R_FOOT	18:04:ED:EB:48:96	Blink	Vibrate		
sensor	R_SHANK	18:04:ED:EB:21:A1	Blink	Vibrate		
sensor	R_THIGH	18:04:ED:F9:A1:7D	Blink	Vibrate		
sensor	PELVIS	18:04:ED:EB:2B:D8	Blink	Vibrate		
sensor	L_SHANK	18:04:ED:7E:65:C6	Blink	Vibrate		
sensor	L_THIGH	18:04:ED:EB:23:33	Blink	Vibrate		

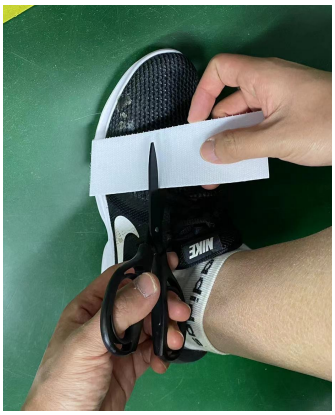
Number of Nodes Required = 7

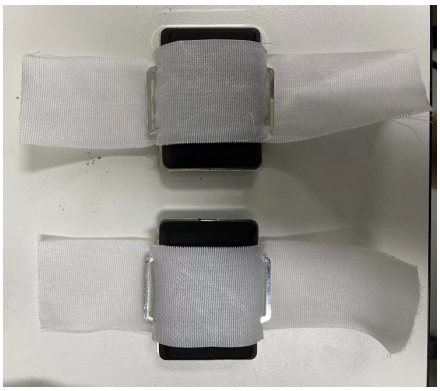
5) Click “Connect Nodes”

6) “Ready to collect data” Will Appear after Node Connection is Complete

GRF Bilateral App *(cont.)*

7) Attach the foot nodes by sticking the rough side of the Velcro to the shoes and the soft side of the Velcro to the nodes. Then, fasten the Velcro together

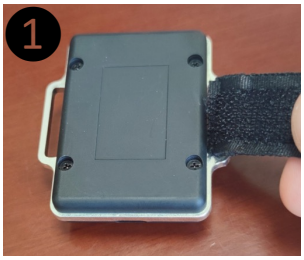


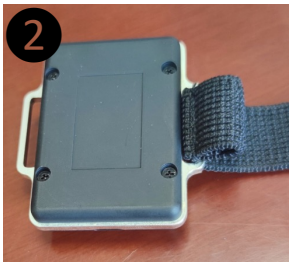


For both nodes, the on/off switch points to the body

8) Thread Straps through the Remaining 5 Nodes

How to Thread Straps

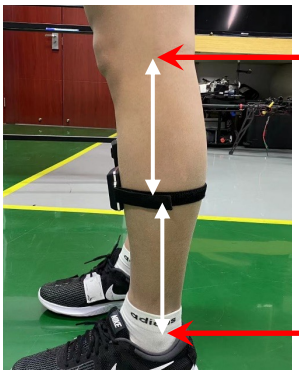




GRF Bilateral App *(cont.)*

9) Attach Nodes to Anterior Shanks – Midway between Femur Lateral Epicondyle and Fibula Apex of Lateral Malleolus

For both nodes, the on/off switch points upwards



Femur Lateral Epicondyle

Fibula Apex of Lateral Malleolus

10) Attach Nodes to Anterior Thighs – Midway between Femur Greater Trochanter and Femur Lateral Epicondyle

For both nodes, the on/off switch points upwards

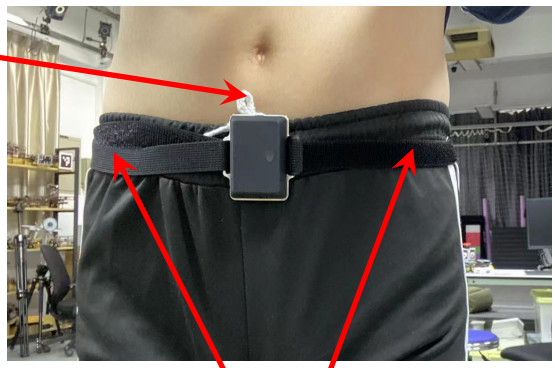
Femur Greater Trochanter

Femur Lateral Epicondyle

GRF Bilateral App *(cont.)*

11) Attach Nodes to Anterior Pelvis – Midway between Left and Right Anterior Superior Iliac Spine

The on/off switch points upwards



Anterior Superior Iliac Spine

12) Click “Blink” for each Node to Confirm Correct Locations (red LED for given node blinks 3 times on click)

Node List

Type	Position	MAC					
sensor	L_FOOT	18:04:ED:E7:83:4F			Blink	Vibrate	
sensor	R_FOOT	18:04:ED:EB:48:96			Blink	Vibrate	
sensor	R_SHANK	18:04:ED:EB:21:A1			Blink	Vibrate	
sensor	R_THIGH	18:04:ED:F9:A1:7D			Blink	Vibrate	
sensor	PELVIS	18:04:ED:EB:2B:D8			Blink	Vibrate	
sensor	L_SHANK	18:04:ED:7E:65:C6			Blink	Vibrate	
sensor	L_THIGH	18:04:ED:EB:23:33			Blink	Vibrate	

Number of Nodes Required = 7

GRF Bilateral App *(cont.)*

13) Enter App Configuration Settings including the Subject's Height and Weight

GRF Bilateral App *(cont.)*

14) Click “Start” to Start Running the App

15) After the Trial is Finished, Click “Stop”

16) After Clicking “Stop”, a File from that Trial will appear under Data Management. Click the file (e.g.trial_3) to download it to the device

GRF Bilateral App *(cont.)*

Description of Data in Downloaded File

time (sec): time since trial start

plate_1_force_x: X component of the GRF acting on the left foot (horizontal force in the medial-lateral direction).

plate_1_force_y: Y component of the GRF acting on the left foot (horizontal force in the anterior-posterior direction).

plate_1_force_z: Z component of the GRF acting on the left foot (vertical force in the superior-inferior direction).

plate_2_force_x: X component of the GRF acting on the right foot (horizontal force in the medial-lateral direction).

plate_2_force_y: Y component of the GRF acting on the right foot (horizontal force in the anterior-posterior direction).

plate_2_force_z: Z component of the GRF acting on the right foot (vertical force in the superior-inferior direction).

SensorIndex_1/2/3/4/5/6/7: index of raw sensor data

AccelX/Y/Z_1/2/3/4/5/6/7 (m/s^2): raw acceleration data

GyroX/Y/Z_1/2/3/4/5/6/7 (deg/s): raw gyroscope data

MagX/Y/Z_1/2/3/4/5/6/7 (μT): raw magnetometer data

Quat1/2/3/4_1/2/3/4/5/6/7: quaternion data

Sampletime_1/2/3/4/5/6/7: timestamp of each sensor

Package_1/2/3/4/5/6/7: package number of each sensor