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Advanced Dynamic Weight Bearing system for mice

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Fanglin Lu[1]
[1]MD,MS

Fanglin Lu

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Protocol status: Working
We use this protocol and it's working

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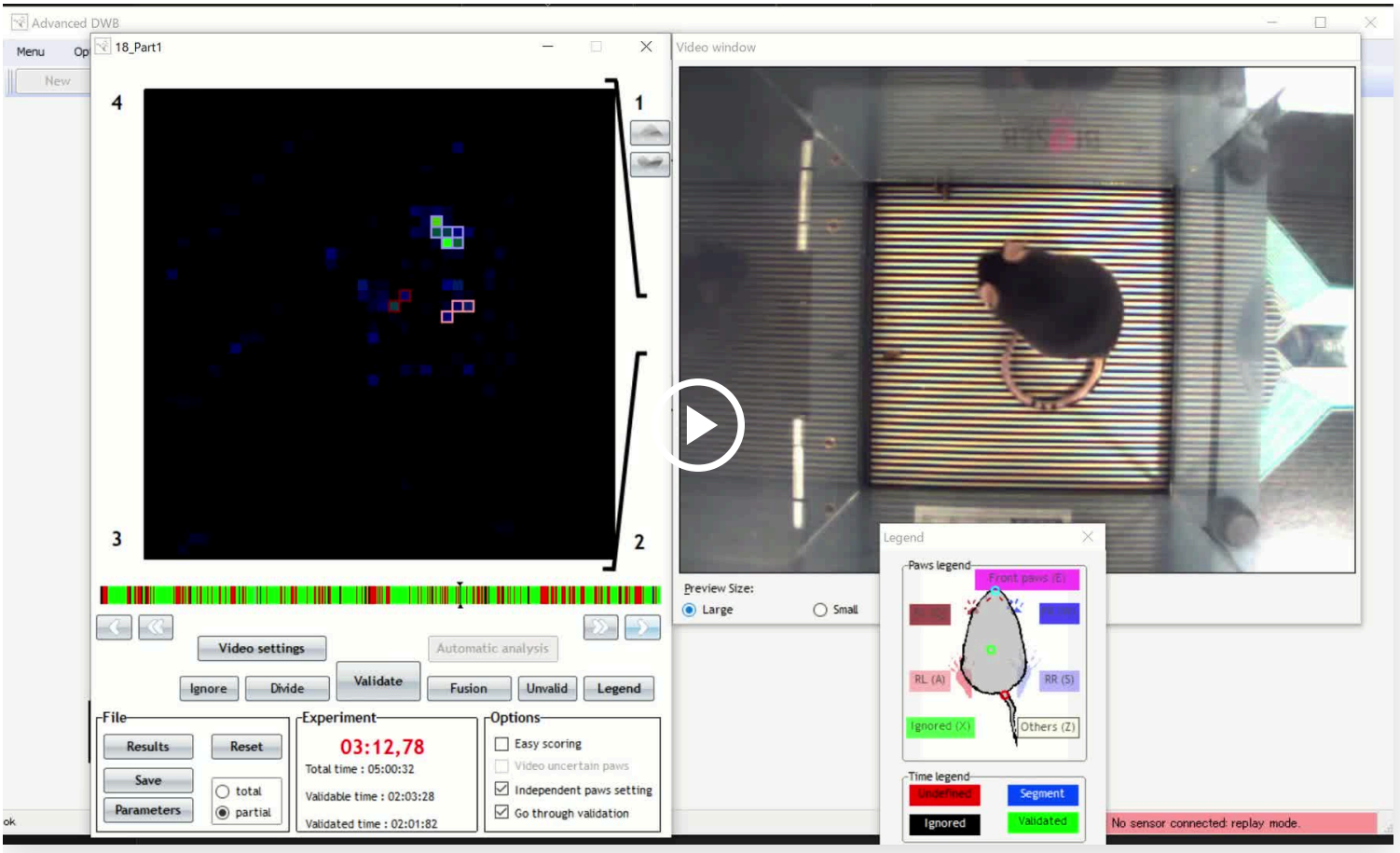
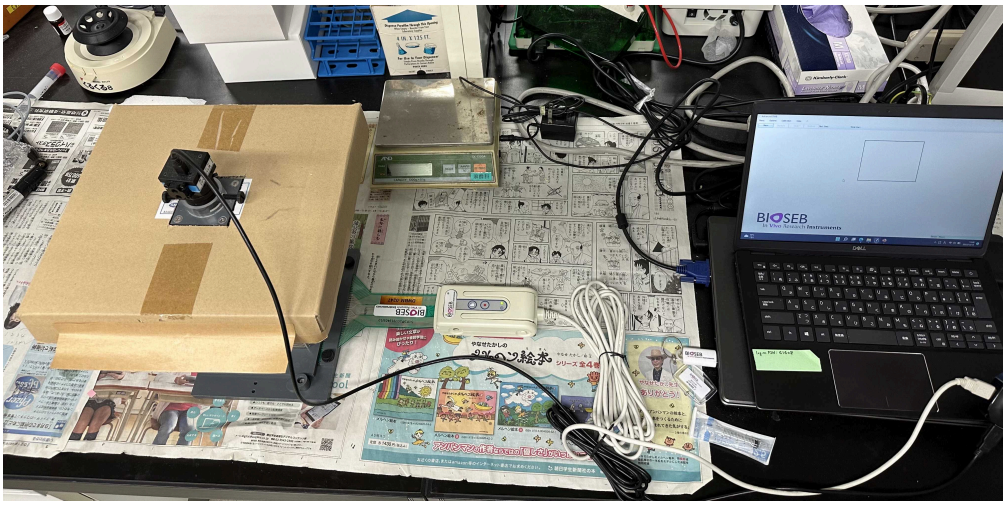
Abstract

We can assess spontaneous limb pain-like behaviors using advanced DWB apparatus, wherein changes in the postural equilibrium of each freely moving animal were tracked and analyzed.
This protocol outlines the procedures from calibration to data analysis.

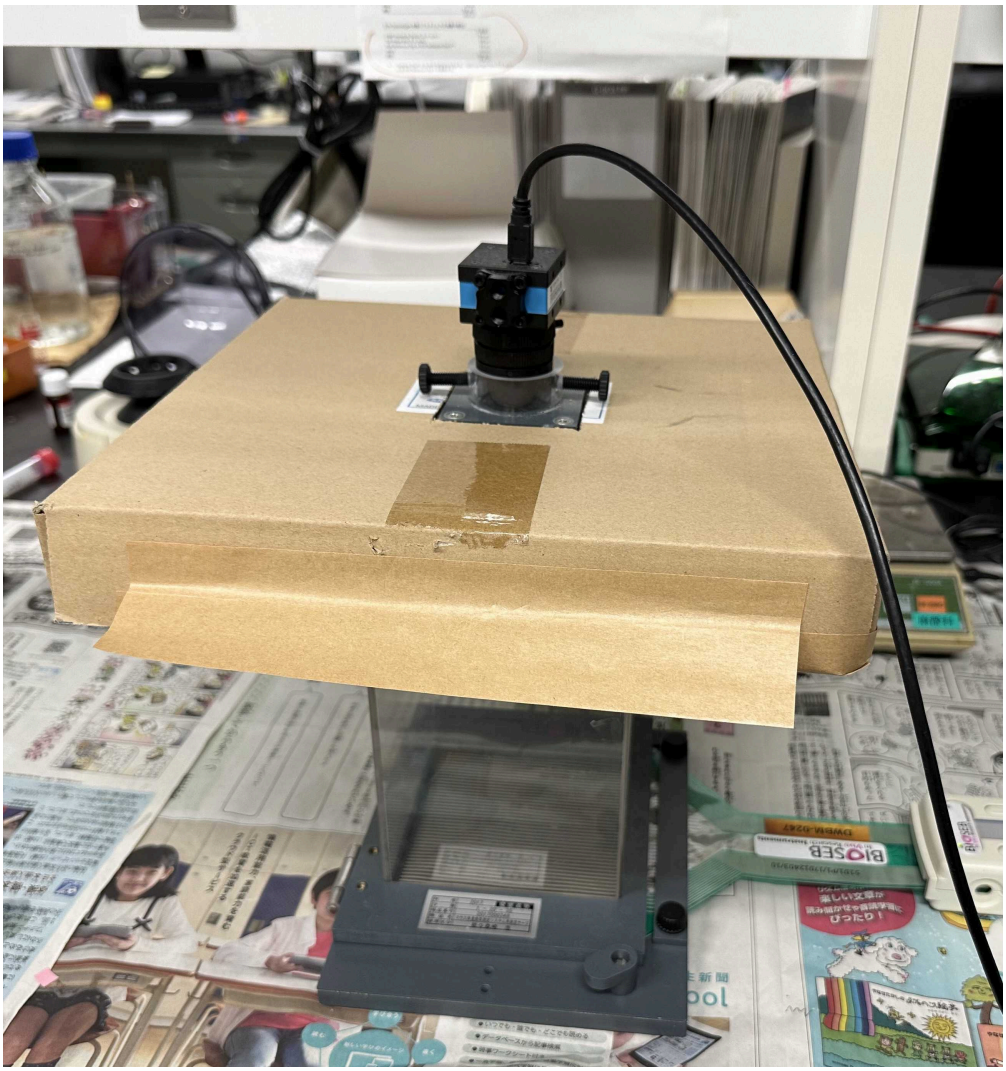


Materials

PC

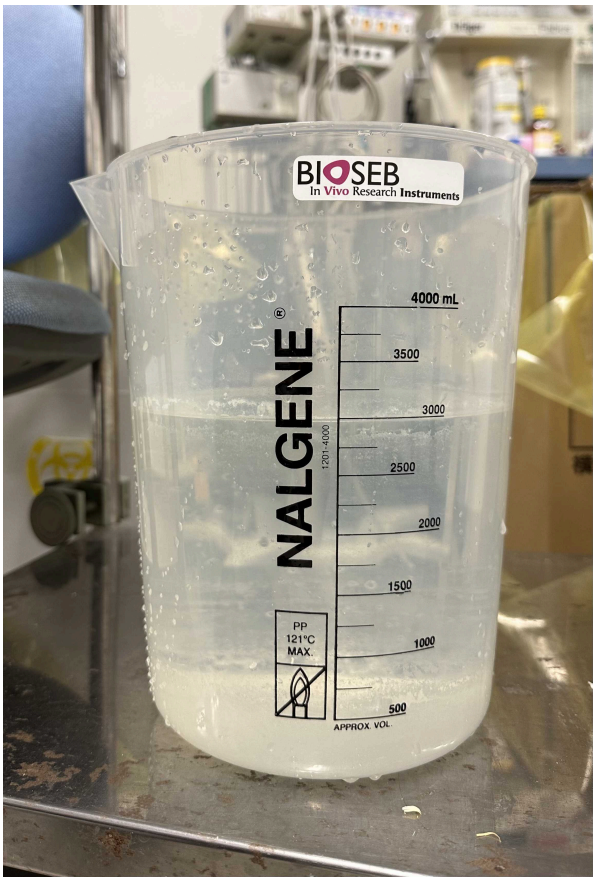


Advanced DWB apparatus (Bioseb, Vitrolles, Provence-Alpes-Côte D'Azur, France; catalog number: BIO-DWB-M)



We made the apparatus a hat to reduce the reflection of room light.

3000mL water



Troubleshooting

Before start

Install the DWB software set (drivers for digital USB camera, driver for PC/sensor interface, video codec, advanced DWB software).

Calibration

1

5m

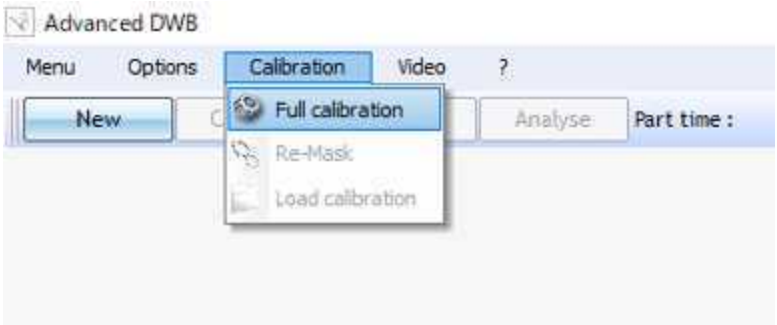
Note

A calibration must be performed before experiment.

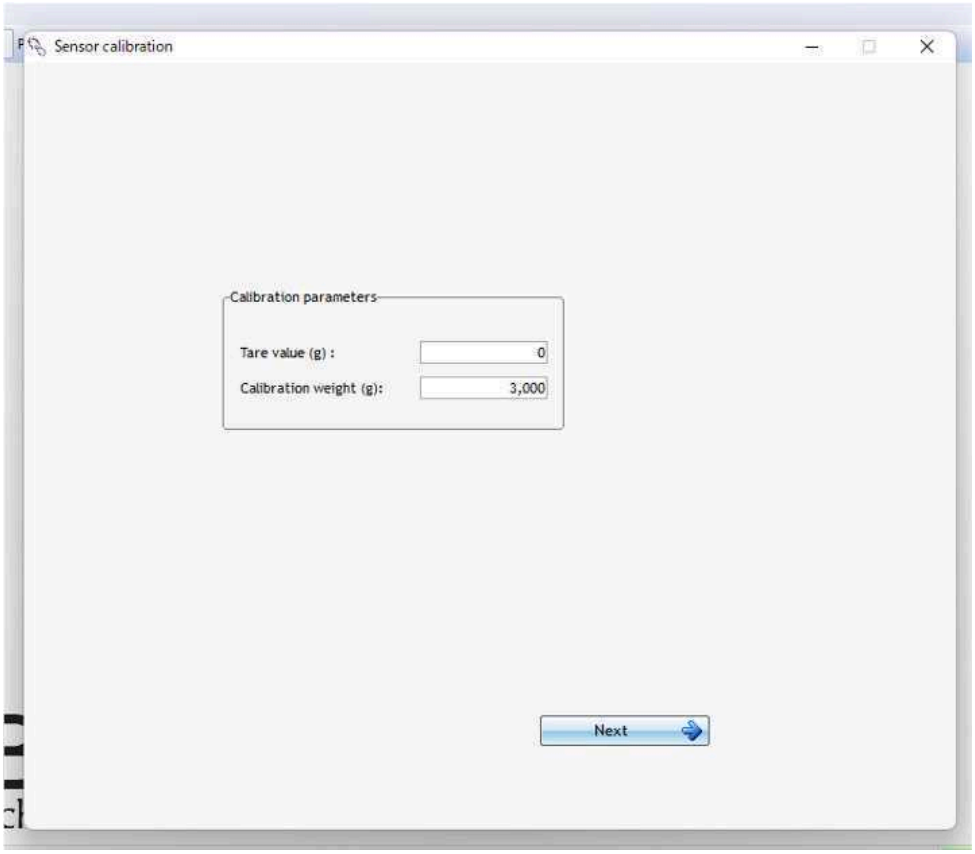
Connect the sensor and the camera to the PC.

2

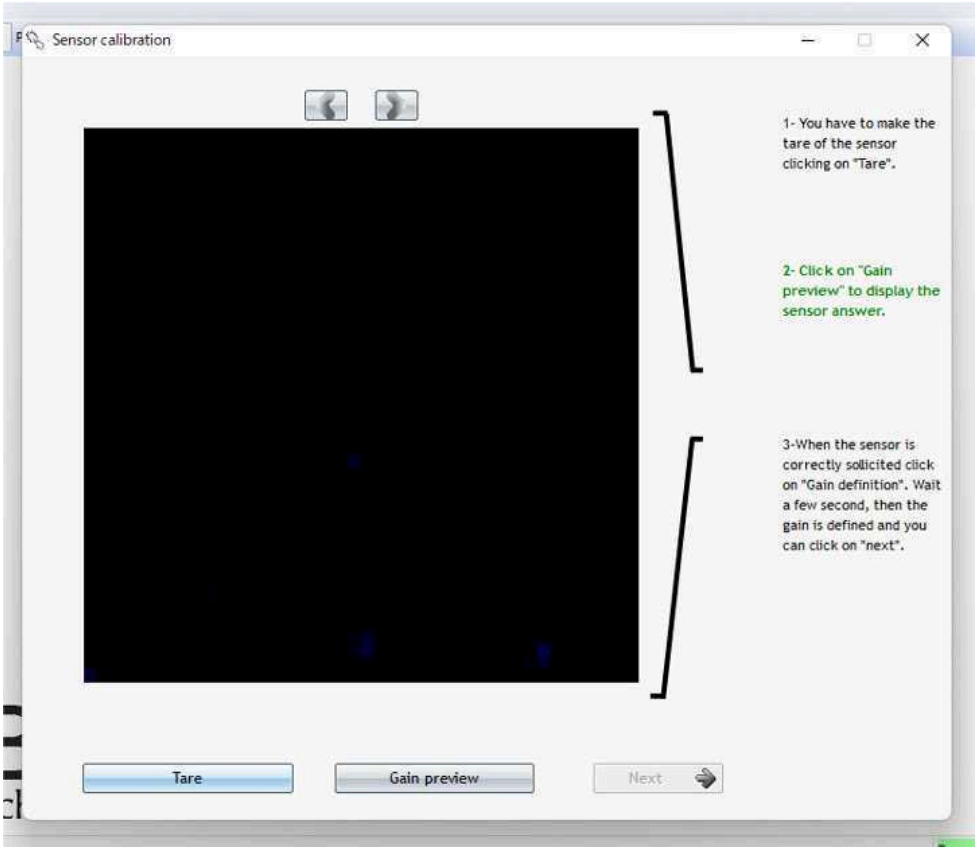
Lauch the software and select the sensor type "Mice".
Click "Full calibration".



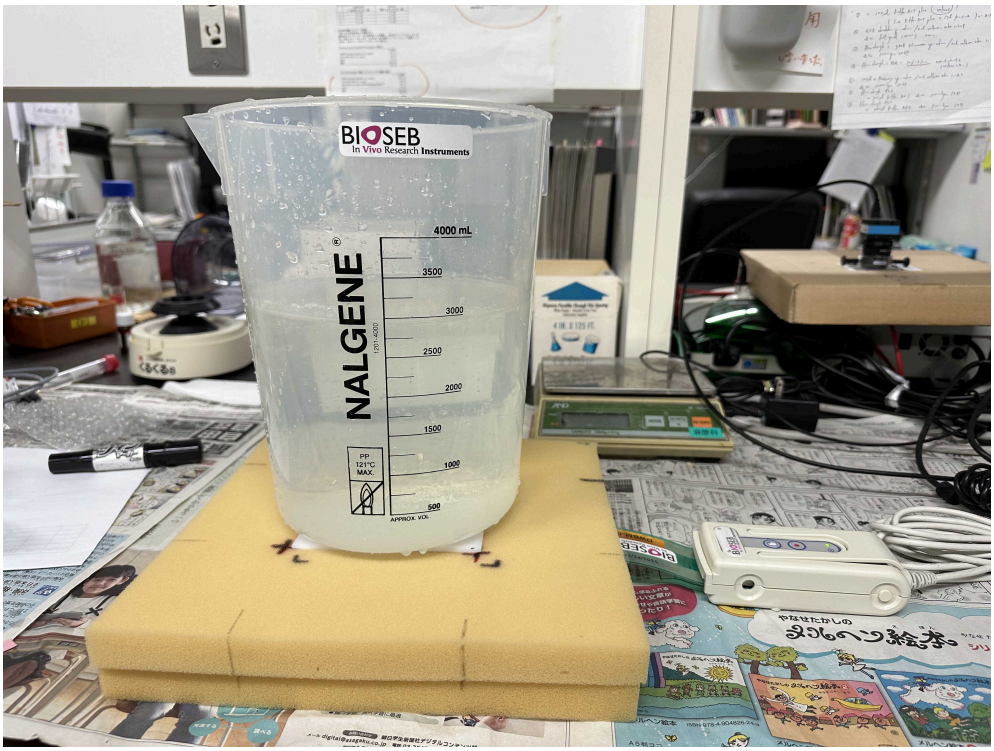
Enter the calibration weight, then click "Next".
For mice, 2000-3000g is preferred, and 7000-10000g for rats



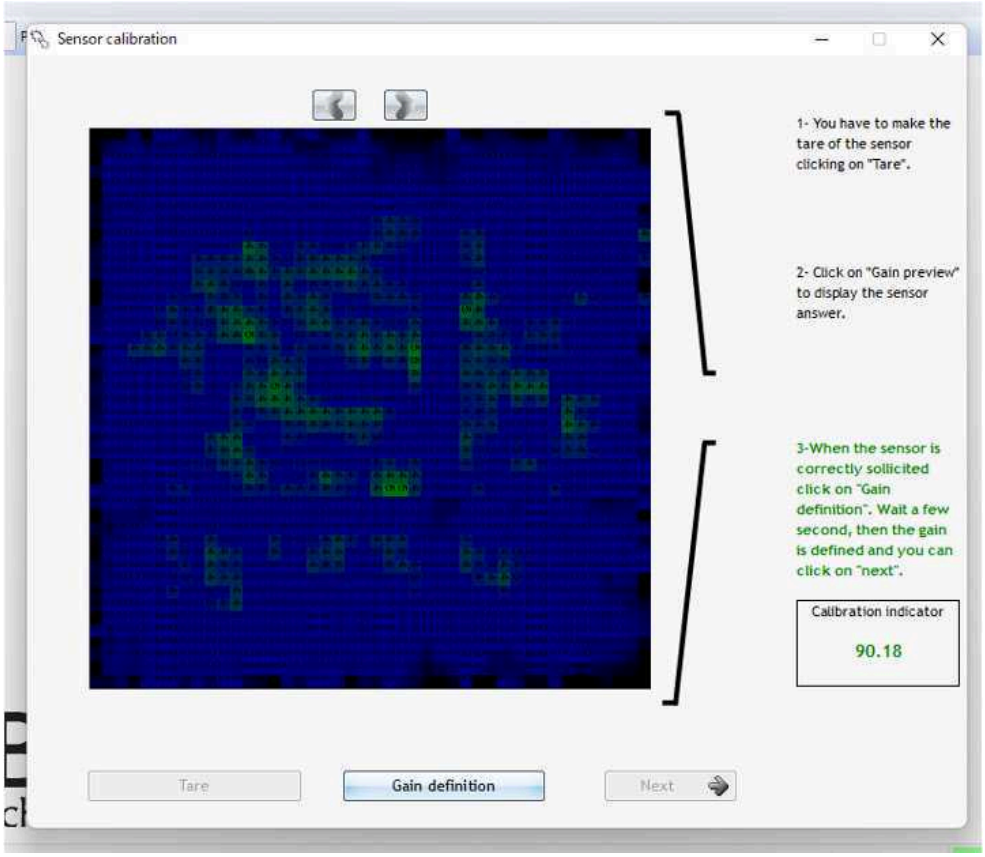
Adjust the display angle of the sensor to match the real sensor direction by clicking "<" or ">" on the top.
Make sure no weight is on the sensor and click "Tare".



Click "Gain preview", and apply the calibration weight (3000g) indirectly on the sensor.


BIOSEB
In Vivo Research Instruments
NALGENE
4000 mL
3500
3000
2500
2000
1500
1000
500
PP
121°C
MAX.

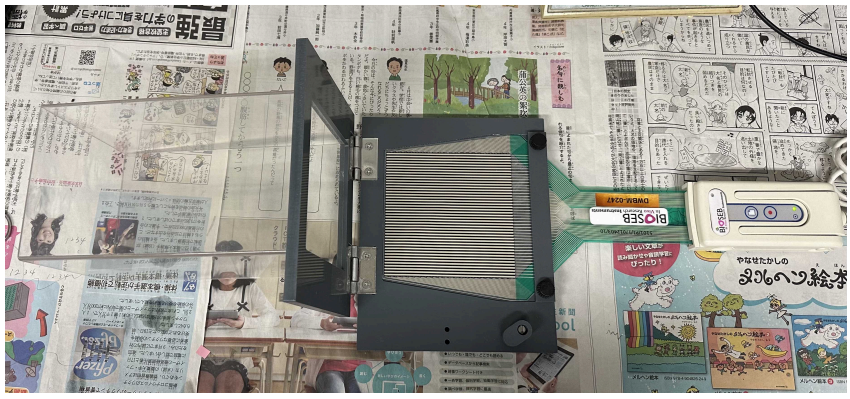
3



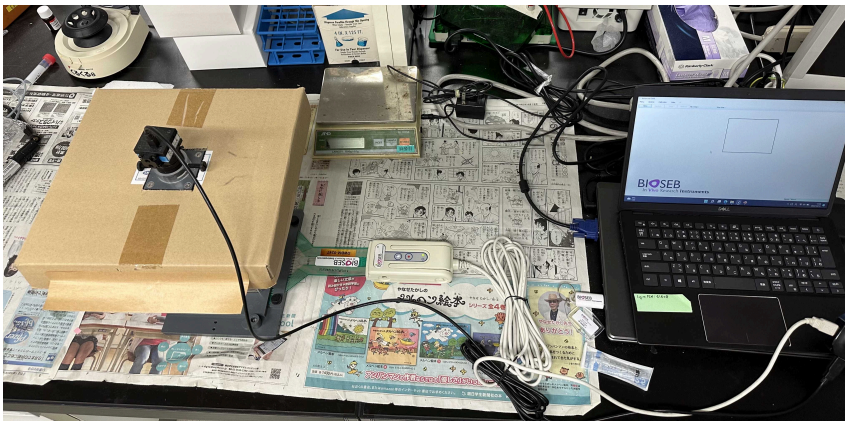
Follow the guidance on the right.

Acquisition setting

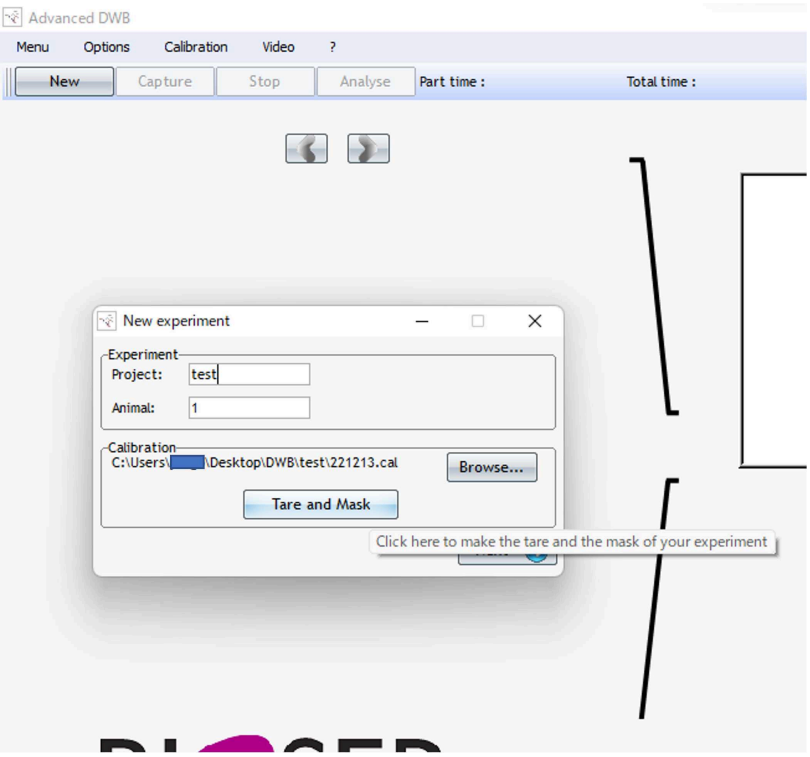
4



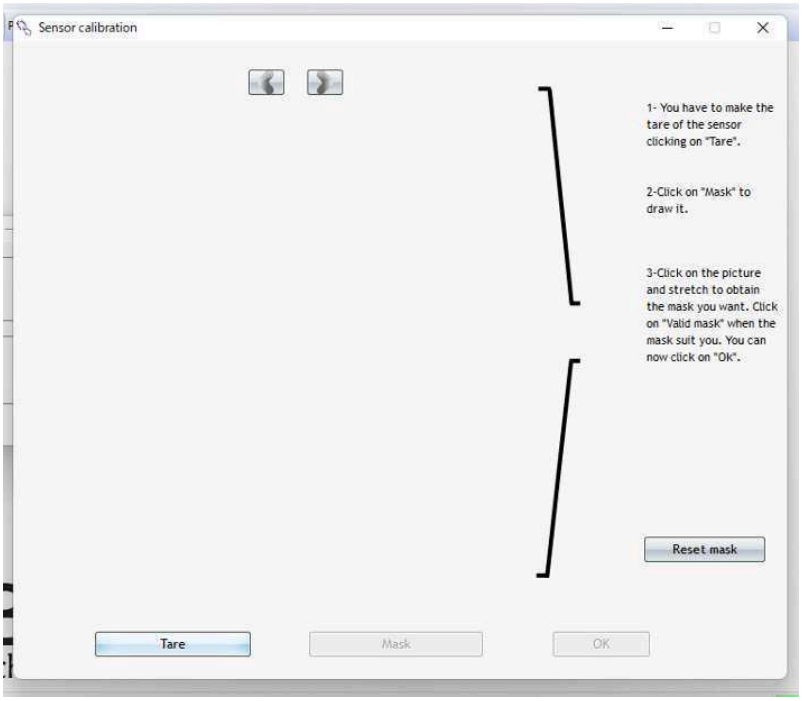
Embed the sensor in the floor of the chamber.



5



Click "New" to create a new experiment project.
Click "Browse..." and select the calibration file that is previously saved.
Click "Tare and Mask".



Follow the guidance on the right.

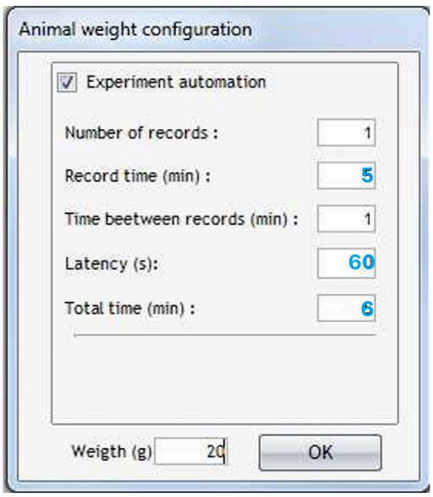
6 Click "Next".
Click "Video setting" to make sure that the DWB software is connected to the digital camera, not WebCam of the PC.
Click "OK".

Data acquisition

7 Place the mouse in the chamber. 2m
Adjust the camera aperture and focus to get a bright and clear image.
Click "Capture" to lauch the acquisition.
Input the weight and click "OK".

Note

We suggest to tick " Experiment automation" to schedule the acquisition automatically.



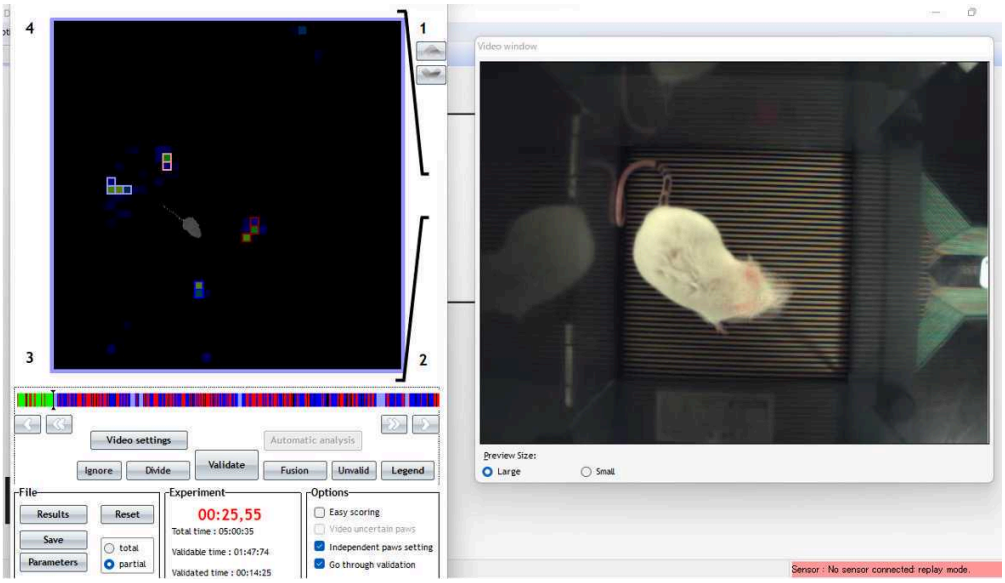
Latency = 60ses: 1min for acclimatization before the recording.
Record time= 5min: We record 5min for each mouse.

The mouse is allowed to move freely in the chamber and changes in postural equilibrium were synchronously and automatically tracked and analyzed by the software.

8 When the capturing is over, click "analysis" and compress the data file.
Place the mouse back to its cage and clean the chamber before the placement of next mouse. 1m

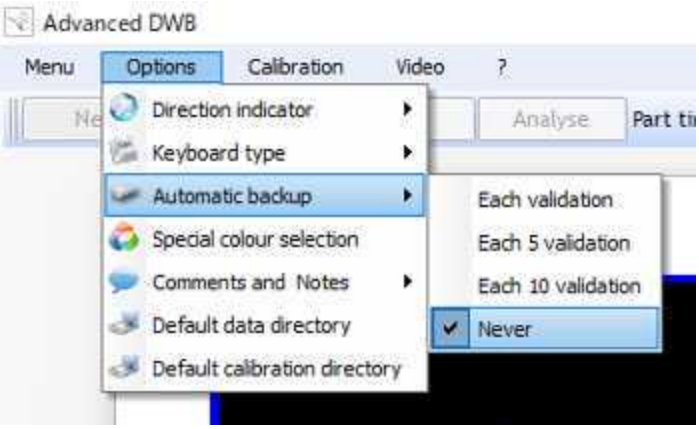
Data analysis 8m

9 Click "Menu"→"Open experiment file..." 6m
Manually validate each automatically presumed paw position to avoid error identification afterward.

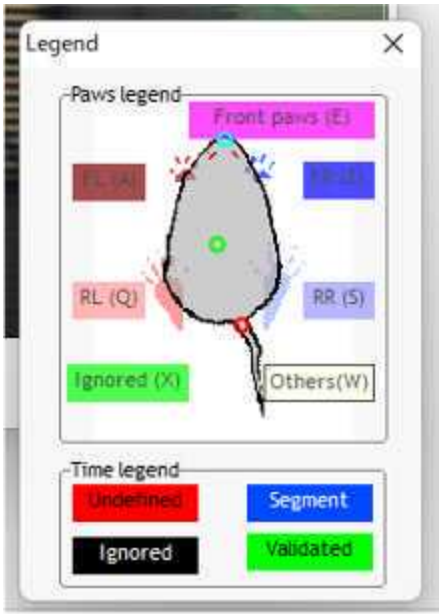


Tick "Independent paws setting" and "Go through validation".

We suggest to choose "never" make a backup during validation as it takes time to save the file.



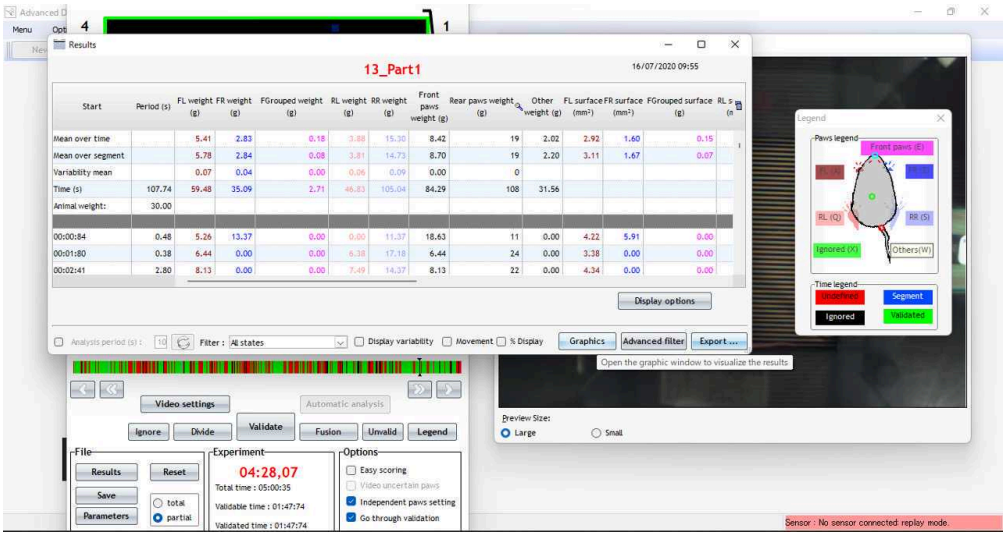
Click "Legend" to help validating each paw position.



Note

A zone was considered valid when the following parameters were detected: ≥0.8 g on one captor with a minimum of two adjacent captors recording ≥1.0 g. A time segment was considered valid if ≥3 stable pictures were detected.

10 After validation, click "Result".



Click "Graphics" to visualize the results.


13_Part1
Total time percentage : 57.7 % 35.0 % 43.4 % 97.4 % 2.51 % 29.2 %
Weight distribution during rearing (g)
Weight when 3 paws are placed (2 rear paws placed) (g
Weight when 4 paws are placed (g)
Weight distribution all over the experiment (g
Front / rear paws weight distribution all over experiment (g)
Time spent on each paw (s)
Time spent per state (s)
Time of rearing
Time on 3 paws including 2 rear paws
Time on 4 paws
Time when rear right paw is raised
Time when rear left paw is raised
Graphics
Current
Global
Print/Export
Close


13_Part1
Total time percentage : 57.7 % 35.0 % 43.4 % 97.4 % 2.51 % 29.2 %
Surface during rearing (mm²)
Surface 3 paws are placed (2 rear paws) (mm²)
Surface when 4 paws are placed (mm²)
Surface distribution all over experiment (mm²)
Front / rear paws surface distribution all over experiment (mm²)
Time spent on each paw (s)
Time spent per state (s)
Time of rearing
Time on 3 paws including 2 rear paws
Time on 4 paws
Time when rear right paw is raised
Time when rear left paw is raised
Graphics
Current
Global
Print/Export
Close