Grip Strength Test

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Summary:

The grip strength test measures forelimb and forelimb- hindlimb combined muscle strength as an indicator of neuromuscular function. These are assessed by the grasping applied by the mouse on a grid that is connected to a sensor. Three trials are carried out in succession measuring forelimb-strength only, followed by three successive trials measuring the combined forelimb/hind limb grip strength.

Reagents and Materials:

Reagent/Material	Vendor	Stock Number
Force Gauge meter w. wire bar grip	Chatillon	E-DFE-002
PC equipped w. Animal Grip Strength Software	San Diego Instruments	Model 6910-0002-L
Lab Coat/Gloves/PPE		
Disinfectant	Nolvasan 10%	
Paper towels		
Disinfectant -Coverage Plus	Steris	

Protocol:

1. SET-UP (acclimation of mice, software setup)

    a. Acclimate mice in quite room for 30 min prior to testing.
    b. Force Gauge Meter configuration:
        1. Turn the unit to "on".
        2. Push the "mode" button (upper left, unmarked) until "T-PK" appears on the right of the screen. This ensures the gauge will only record the peak tension value achieved.
        3. Push the "units" button until "GF" appears on the right of the screen. This ensures the gauge will only record in grams of force.
        4. Clean the wire bar grip with 10% Nolvasan prior to use.

    c. Creating a New Study in the Grip Strength System software
        1. On the desktop, click the "Grip Strength.exe" icon.
        2. Click on the file tab and create a new study database. Save the file in the desired folder.
        3. Click on the file tab and select "define subjects."

4. Enable the add tool bar button >*.
5. Click on the "add subject record" and type in the subject ID. Type in the group, group ID (use this for genotype), variable (use this for sex), and group order.
6. Click on the "save subject record" tab.
7. Repeat steps 7.3.4-7.3.6 for each animal.

3. PROCEDURE

a. Click on the "run" tab under the "open session" file. Click open comm." for the forelimb side and choose comm. 4 (ensure force meter is in "T-Peak" (tension) mode.
b. Click on "start run" to test first mouse.
c. <u>Forelimb measurement:</u> Gently lower the mouse over the top of the grid (**in the center**), so that *only* its *front* paws can grip the grid. Allow the mouse to attach to the grid properly before pulling it away. Keep the torso horizontal and pull the mouse back steadily and horizontally (not jerking) until the grip is released down the complete length of the grid. When the animal releases the grid, the maximal grip strength value of the animal is displayed on the screen. Record the value manually or automatically as appropriate. Repeat this procedure to obtain 2 more forelimb grip strength measurements.
   <u>NOTE:</u> Click the "zero button" to tare the force meter between runs.
d. Click "close comm" for forelimbs and click "open comm" under the forelimb-hind limb combined section. Choose com 3 and ensure the force meter is in "C-Peak" (compression) mode. Use this function if testing all four limbs.
e. <u>Forelimb and hind limb measurement</u>**:** Gently lower the mouse over the top of the grid (**in the center**), so that *both* its front paws and hind paws can grip the grid. Allow the mouse to attach to the grid properly before pulling it away. Keep the torso parallel to the grid and pull the mouse back steadily and horizontally (not jerking) until the grip is released down the complete length of the grid. Record the value manually or automatically as appropriate. Repeat this procedure to obtain a further 2 forelimb and hind limb grip strength measurements.
f. After the last trial of the animal a window will show that the animal is done. The computer will automatically switch to the next animal. Make sure to change the run number back to 1 before beginning the next animal. Close comm for hind limbs and open comm for forelimbs.
g. In between mice, clean the wire bar grip with 10% Nolvasan and change gloves.
h. At the end of the procedure, wipe the force meter, platform, wire bar grip and surrounding bench top with Coverage Plus, let stand for 10 minutes, then rinse.