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🌐 Pole Test Assessment

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ABSTRACT

Pole test is a simple behavior test used to assess fine motor coordination. Mice are placed
at the top of a 50-60 cm vertical pole with a diameter of 1 cm. The pole is attached to a
base that is placed in the home cage so that mice might prefer to descend to the floor of
cage. The test is conducted over 3 days: training day 1, training day 2, and test day. Each
mouse has 3 trials during the test day as well as on training days. Daily sessions should be
consecutive (i.e., do not let training and test days be separated by a weekend). Record
each trial on test day with a camera to obtain accurate measures of both time-to-turn
(TTT) and total-time-to-descend (TTD).

MATERIALS

1. A metal pole with a diameter of 1cm and height of 50-60cm, this should come on a base. (See attached photo).
2. Foam/PVC liner, we use a cabinet liner similar to what can be found here. Adhesive Grip for Pole Test.
3. Standard Mouse cages.
4. Stopwatch/Timer.
5. GoPro/Means of recording each trial.

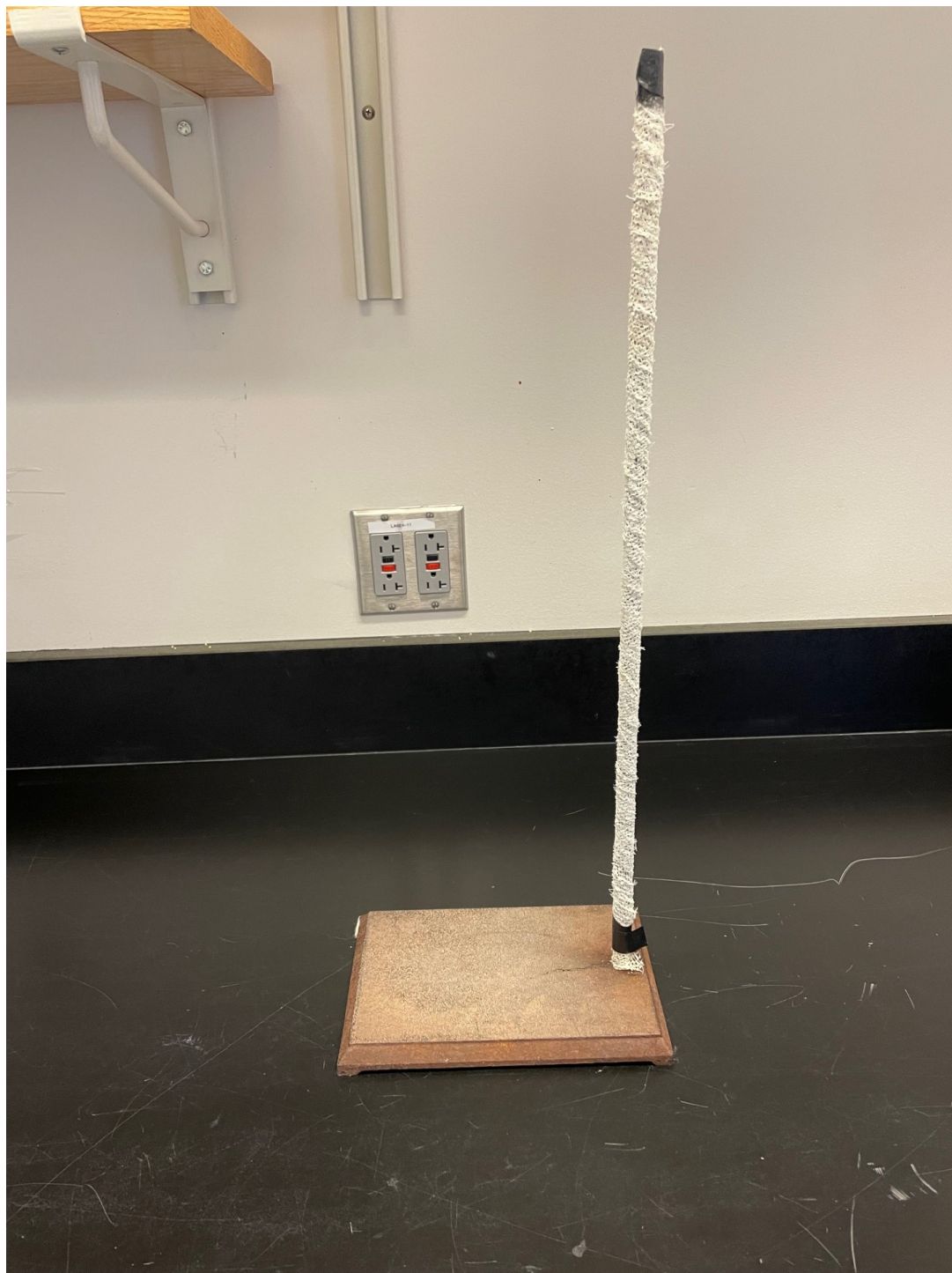Figure 1. Example of pole test apparatus used by our lab.

Pole set-up

1 Find a metal pole 1cm in diameter with a height of ~50-60cm. This should have a base that is able to fit inside of a standard mouse cage.

2 Wrap the pole with an adhesive foam or PVC material (see material for link). This should cover the entire pole and be replaced as it wears down.

3 Tape the top and bottom of the adhesive to secure to the pole.

4 Wipe down the base and pole with 70% EtOH before beginning any trials and between each mouse.

Acclimation

5 On each training and assessment day bring the mice up from the vivarium to the behavior room at least 1h prior to assessment to allow for acclimation to the environment prior to assessment.

Training Day 1

6 Determine the order of assessment that you will use for the length of the training and assessment, record this in lab notebook.

7 Remove all mice from the first cage assessed and place into a clean empty mouse cage. Pole test training and assessment will be performed in the home cage.

8   In the now empty home cage, push bedding to one side and place the pole apparatus into the middle of the cage, adjusting until it is level in the cage.

9   Place a single mouse into the home cage, now containing the pole apparatus, allowing them to roam freely for 30 seconds.

10   Training day 1 will then consist of three trials for each mouse.

     10.1   Trial 1: Place mouse ***half-way*** up the pole ***face down*** and allow it to descend freely.

     10.2   Trial 2: Place mouse ***at the top*** of the pole ***face down*** and allow to descend freely.

     10.3   Trial 3: Place mouse ***at the top*** of the pole, this time ***face up***. To prevent the mouse from attempting to go over the pole instead of turning on the pole, place your free hand over the top of the pole. Allow the mouse to take its time turning/descending freely.

11   In between each trial allow the mouse to roam the home cage for 30 seconds.

12   In some instances a mouse may not complete all trials. In this case, remove the mouse from the pole allow to roam free, and start back over at trial 1 until the mouse has completed all 3 trials.

Training Day 2

13 Repeat all steps from training day 1 no more than 24h later. At this point the mice should be able to perform all trials without issue.

Assessment

14 No more than 24h after training day 2 the mice should be assessed for their ability to descend the pole.

15 Repeat steps 6-9 for each mouse.

16 Start recording, so that each mouses trial is captured.

17 Place the mouse face up on top of the pole, and this time do not intervene with your hand. By now the mouse should not attempt to go over the pole. If it does, begin the trial again.

18 Begin the stopwatch/timer as soon as you place the mouse on the pole. Stop timing once it fully descends and both front paws are touching the ground.

19 Record the time-to-descend (TTD) in your notebook.

20 Allow the mouse to free roam post descent for 30 seconds.

21 Repeat this 2 more times (total of 3 trials) for each mouse.

22 Clean the pole and base between each mouse using 70% EtOH.

23 After all mice in a cage are assessed, replace mice in the cage and place pole (cleaned) into a new home cage.

Analysis

24 Two measures are analyzed for this pole test assessment.

25 Time-to-descend (TTD) is calculated by taking the average time to descend the pole from the 3 trials of each mouse. This measure can be compared between genotypes, treatment groups, cages, etc.

26 Time-to-turn (TTT) is calculated post assessment via watching and analyzing the recorded videos. A time to turn is calculated by determining the amount of time it takes the mouse to fully turn its body in each trial. The mouse has successfully completed a turn once its body is in perfect alignment with the pole, face down, in the opposite position as it was placed.

Notes

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27.1 Mouse won't or cannot turn around and/or descend = Physically Unable to Perform (PUP)

27.2 Mouse falls off or slides down pole (shouldn't happen if pole is wrapped in grippy material, such as electric tape or ideally non-slip shelf liner) = PUP

27.3 Mouse descends sideways and never fully aligns its body with pole = count as TTT, no descent time recorded.

27.4 Mouse nearly descends, but goes back up the pole again = PUP/exclude trial