

<b>Title</b>	Effects of Ethanol [EtOH] on Gait
<b>Number of animals</b>	3
<b>Species/strain</b>	B6 mice recommended
<b>Instrumentation needed</b>	DigiGait Imaging System
<b>Reagents required</b>	200 Proof ethanol [Sigma]
<b>Time to perform</b>	45 minutes for 6 data points

“Ataxia” is a broad term used to describe numerous gait disturbances. There are numerous human disorders that are characterized by “ataxic gait”. Historically, many mouse models of human disorders have been described as “ataxic”, but very often the ataxia in mice is described in general terms. For example, several mouse models of the various genotypes of spinocerebellar ataxia [SCA] have all been referred to as “ataxic”, including SCA1, SCA2, SCA3, and SCA6. The ethanol-induced “ataxia” model reported here provides researchers an intuitive model of ataxia *[who among us has not seen or experienced the classic stagger of one who has consumed excessive alcohol?!]*, and provides clear quantifiable metrics indicative of motor deficits associated with ethanol. This easy and fast protocol not only provides investigators with an opportunity to learn 1<sup>st</sup> hand exactly how ethanol and affect the neuromuscular system, but also better equips them with an immediate appreciation of **how** an ataxic gait might actually manifest itself in their particular animal models.

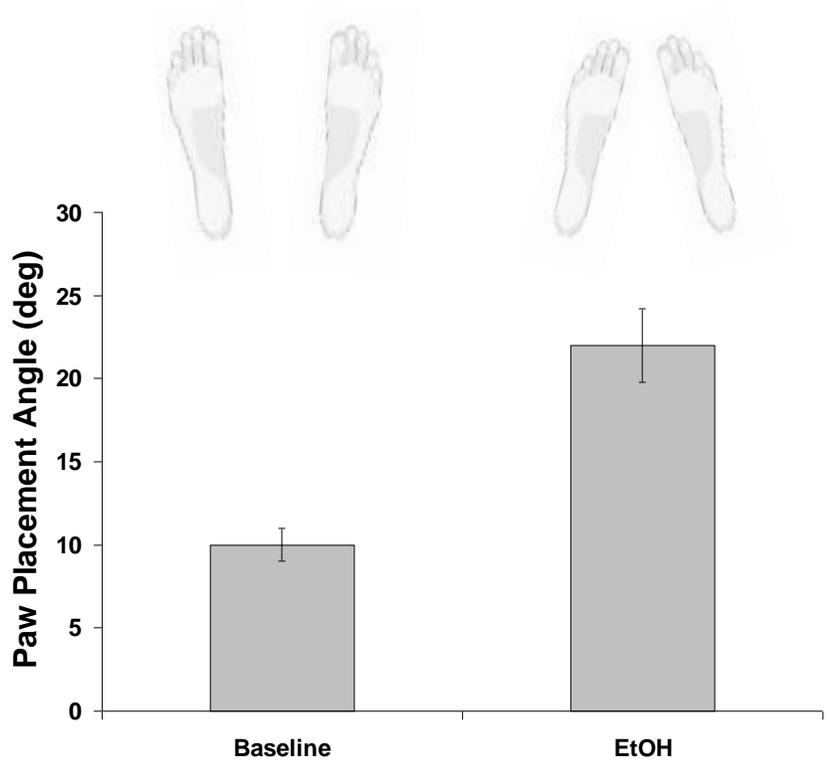
1. Place subject into walking compartment and turn treadmill on. Suggested speeds of 30 cm/s.
2. Capture images of subject moving fluidly and maintaining treadmill speed. Aim to capture ~4 seconds of video.
3. After movie from mouse 1 has been archived, administer ethanol IP [start out with ~1.75 g/kg].
4. Repeat above steps for the other two animals.
5. After ~10 minutes of ethanol administration, repeat imaging as described above.
6. Actual data collection should take <25minutes for 6 mice [ 3 at baseline and post ~10 minutes ethanol administration].
7. Analyze the movies 6 movies via DigiGait. Computation time should take <20 minutes.
8. Using the Re-organize functionality, collect gait metrics from the 6 movies into one spreadsheet, and group/compare n=3 baseline vs. n=3 ethanol-treated.

**Results:**

The effects of EtOH are fairly rapid. It is easy to administer too much ethanol, and many of its effects are strain dependent, gender dependent, and also dependent on the metabolic status of the animal.

Compare your findings with the data shown here in Figure 1.

**Discussion:** Study your spreadsheet and plot, for example, braking duration as a function of increasing doses of EtOH. Do the animals have the same hind limb capacity to “brake” [the upstroke of the gait signals] after EtOH? By studying the limb recruitment pattern of the limbs before and after ethanol, would you say that the animal is uncoordinated after ethanol? Or are there other aspects of gait, either postural or kinematic, that [better] quantify the “ataxic” motor deficits?



A companion lateral view indicates the effect of ethanol on reduced postural muscle tone. Note, for instance, the reduction in tail height, the reduced lift of the hind paws, and the drop of the animal’s torso during walking after ethanol administration.

*“...better data from every mouse!”*