TRIGGERED COLLAPSE PLATFORM (TCP)

20-002

Device to Produce Mild Traumatic Brain Injury (mTBI) in Murine Models with High Reproducibility

ISSUE

Traumatic Brain Injuries (TBIs) are a health crisis with millions of people suffering injuries each year. The majority of TBIs are mild injuries (mTBIs,) which often produce no unconsciousness and no gross damage to the brain or skull. However, there are no existing research devices that are capable of simulating mTBIs with high reproducibility. Existing devices with high reproducibility result in injuries too severe to characterize as mild as is the case when using the Controlled Cortical Impact (CCI) device. Those that produce less severe injuries have poor reproducibility.

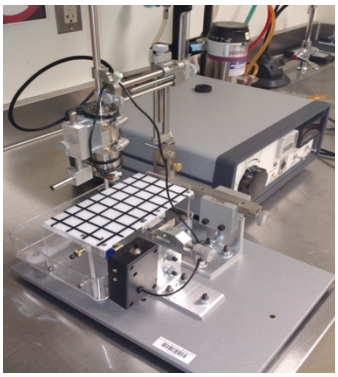
All research organizations studying mTBI memory and cognitive deficits and therapeutic and pharmacological interventions NEED instruments that can simulate mTBI with high reproducibility.

SOLUTION

The TCP device is used with the CCI device. A trapdoor-platform holds the mouse under the CCI . When the impactor strikes the mouse's head, the platform is released, and the mouse falls into a lower chamber. The simultaneous impact/fall reduces the severity of the injury, allowing for the study of mild and ultra-mild trauma. The collapsible platform is held in place by magnetic flux, which is precisely adjustable. At impact, the holding force is exceeded, and the platform falls. Where ultra-mild impact forces or very small impact depths are used, an actuator triggered by a sensor on the impactor forces the platform to fall. Using magnetic force to hold the platform eliminates the friction and sticking that occurs with physical contact, allowing precise replicability.

ADVANTAGES

- Produces much less Glial Fibrillary Acidic Protein (GFAP)than CCI injuries without the TCP
- Can vary rotation upon impact, key to some research
- Low-anesthesia and non-compressive forces makes this method highly translational to concussive human injuries.
- Produces shorter time to righting and time to ambulation than other mild TBI methods



CURRENT STAGE OF DEVELOPMENT

Working model used for several studies

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