

Jamie Anson, and James Bales
Neuro 430, Kids Judge Proposal
Topic - Brain damage (3 kinds)

Purpose: To demonstrate how and why damage to the CNS can be very severe. And why hitting your head can be so traumatic.

Materials:

- A number of children (preferably about 10)
- Balloons (deflated)
- Wire (formed into round open "skulls")
- A number of small rubber balls (racquet balls or tennis balls)

Procedure:

- 3 types of damage to demonstrate (swelling, mechanical, chemical)
- Line up the kids along the "brainstem" and "spine" (labeled points on floor)
 - Have them hold hands
 - Squeeze hands one after another to show how the brain can tell the arm to move
 - Simulate whiplash by having the "brain" jog forward and backward, while the "spine" stays still
 - Should have difficulty continuing to hold hands (simulates axonal tearing and shearing -mechanical-)
 - Have kids each take a wire "skull" and try to blow up the balloon inside of it (simulates swelling)
 - Have kids sit on floor facing one another across "synapse" let them pass the balls to the other side, now dump too many for kids to handle into synapse (simulates glutamate toxicity -chemical-)
 - Line up again holding hands, but some of the "axons" have died so there are no gaps in the chain and the "brain" can no longer communicate to hand.

Issues:

- Chemotoxicity is a complex system of calcium influx, NMDA activation, and glutamate release that is not fully understood.
- Axons have resistance to shearing and tearing forces, it is the twisting during head injury that increases the damage due to tearing and shearing.
- Further mechanical damage includes bleeding and impact against skull.
- Not all brain damage is caused in the same way (eg. stroke, alzheimers, etc.)