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Improving Protective Sports Helmet Designs to Prevent Against Mild Traumatic Brain Injuries

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Mild traumatic brain injuries are a common injury in contact sports such as ice hockey, and improving the designs of helmets can lower their prevalence and severity. Current helmet designs are excellent at preventing acute injuries, but only offer limited protection against diffuse axonal injuries. Studying strain in both the brain tissue and axon fibers in laboratory testing and computer simulation environments can help manufacturers improve their sports helmet products. 21st century technologies such as artificial neural networks and advanced finite element models of the human body can be used to predict how the brain responds to direct and indirect impacts, and will accelerate the evolution of the design of protective sports helmets. Lastly, studying the brain's response in live specimens using high speed ultrasonic scanners will generate additional data that can be used to improve how helmets prevent against diffuse axonal injuries.