Real-Time Measurement of Impact Forces that May Cause Concussion, Using Wearable Technology

Status: Filled

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in contact sports such as football and hockey, making Sports related concussion about 2
the total nu

Thalted, the brain will continue to move and will only stop as it is pushed up against the s
the same time, sharp twisting of the brain results in a shearing force, which can cause dif
axonal injury or subdural hematoma. As a result, the membrane of the brain can be strain
damaged by the shear forces, likely resulting in a head injury or concussion. The bulk mo
(resistance to uniform compression) of human brain tissue is around one million times hig
than the shear modulus. Therefore, human brain tissue is significantly more sensitive to t
shear forces caused by rotational and linear accelerations than to compression resulting f
linear acceleration. Although this membrane may regain its regular form in some cases,
depending on the severity of the impact, it may not recover. Thus, the magnitude of rotati
forces is thought to be the key contributing component in TBI and its severity. Sports helm
that are available today, established in 2008, has made pioneering studies on reduction of
sudden rotation of the head during an impact in activities that require the user to wear a h

These contributions have resulted in six Canadian and international patents, leading to the ShieldX commercialized membrane technology.

Project Main Objective(s):
Development of a real-time monitoring sensor suite, to find the location, direction and the magnitude of the impacting force. The device should provide flexibility to be embedded in either a helmet, toque or a headband. The sensor suite must measure impact forces in real time, transmit the information wirelessly to a computer or an iPad.