Docket #: S15-432

Instrumented Mouthguard to Determine Accurate Head Motion During Impacts

Stanford researchers at the Camarillo Lab have designed an instrumented mouthguard which provides accurate measurements of head motion during impacts. The accurate measurements are achieved by rigidly affixing sensors to dentition in the mouth, which are a part of the skull, and are designed to isolate the measurement sensors from perturbances caused by the jaw closing.
Studies using the working prototype showed that this new method can better distinguish between truly dangerous head blows and noise, compared to existing technology.

Stage of Research

- Working prototype tested
- Studies showed that this new design can accurately measure head motion in cases where jaw dynamics caused large errors in current mouthguard designs

Related to **Stanford Invention S13-015** - A Novel Approach for Detecting Head Collisions in Sports

Applications

- **Mouthguard to measure head motion** in sports, military, and recreation industries
- **Research applications** - Data from this device can be used to inform medical professionals about the risk of brain injuries, provide further research on the cause of brain injuries, and develop preventative devices to protect against brain injuries.

Advantages

- Accurate measurement
- Robust
- Compact
- Embedded instrumentation in mouthguard
- Significant improvement in distinguishing between truly dangerous head blows and noise, compared to existing technology

Publications

- Laksari K, Wu LC, Kurt M, Kuo C, Camarillo DB. "Resonance of human brain under head acceleration." Journal of The Royal Society Interface. vol. 12, no. 108, pp. 20150331. 2015

Patents

- Published Application: 20170156635
- Issued: 11,589,780 (USA)

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