Study shows cycling as number one cause of cervical fractures in men

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Sporting-related cervical fractures increased by 35 percent from 2000 to 2015, mainly due to an increase in cycling-related injuries, according to research presented at the 2018 Annual Meeting of the American Academy of Orthopaedic Surgeons (AAOS). Men experienced the most fractures due to cycling, while the most common cause of fractures in women was horseback riding. The most common cause of cervical spine injury in the United States was football, with the majority of those injuries being sprains.

"Cervical spine injury is a substantial cause of morbidity and mortality, and, as far as injuries go, one of the more devastating injuries that we as orthopaedic surgeons can treat," said lead study author J. Mason DePasse, MD, orthopaedic trauma surgery fellow at Brown University. "There isn't much data available on spine/neck injuries in recreational activities and sports. The most recent paper we quoted was from 1991 and looked only at 63 male patients. In our study, we were able to sort through more than 50,000 cases by utilizing data analytics, which would have been nearly impossible to sift through by hand. The biggest takeaway was that cycling is the number one cause of neck fractures, which suggests we may need to investigate this in terms of safety."

Sporting activities are the fourth most common cause of cervical spine injury; however previous studies relied mainly on media reports, which resulted in significant underreporting. This study utilized the National Electronic Injury Surveillance System (NEISS) database, which is managed by the Consumer Product Safety Commission (CPSC) and

collects information on emergency room patients from 100 U.S. hospitals. The researchers used the NEISS database to estimate the sex-specific incidence of cervical spine injuries in sporting activities and to identify the activities most commonly associated with neck sprains and cervical fractures.

The study authors identified 27,546 patients who sustained a neck injury during a sporting activity. Of these patients, the study found:

- Overall, the number of neck sprains decreased by 33 percent from 2000 to 2015; however, sprains sustained during weightlifting and aerobic exercise increased 66 percent.
- Sporting-related cervical fractures increased by 30 percent in that time period, which was driven in part by a 300 percent increase in cycling-related injuries.
- The incidence of injuries in males was 1.7 times higher for neck sprains and 3.6 times greater for fractures when compared to females.
- The most common causes of neck sprains overall were football, followed by weightlifting/aerobics, cycling, trampoline and diving/swimming.
- Football was the most common cause of cervical sprains in men, followed by cycling and weightlifting/aerobics. Cycling caused the most fractures in males, followed by diving/swimming and football.
- Women experienced the most neck sprains during weightlifting/aerobics, trampoline and cheerleading. Horseback riding caused the most cervical fractures in females, followed by cycling and diving/swimming.

The study demonstrated that while football remains the main cause of cervical injuries in the U.S., it was primarily associated with sprains and the overall incidence of football-related injuries decreased. The

researchers hypothesized that this could be due to better protective equipment and safety rules. It also could be due to the increased use of computed tomography, which has resulted in an increased diagnosis of cervical spine fractures that may have been previously diagnosed as a sprain.

The team used SAS 9.4 for analysis and built algorithms involving string recognition and automated text analysis that went through the over 50,000 patient cases. Patients were preliminarily included based on specific criteria, including association with recreational activity, diagnosis code indicating fracture or strain/sprain, and body part indicating neck region. Repeated testing and algorithm refinement was utilized to exclude irrelevant cases. Statistical significance was defined as p