

# Concussions and Head Impacts in Water Polo

**UCI** Exercise Medicine & Sport Sciences Initiative

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## Background

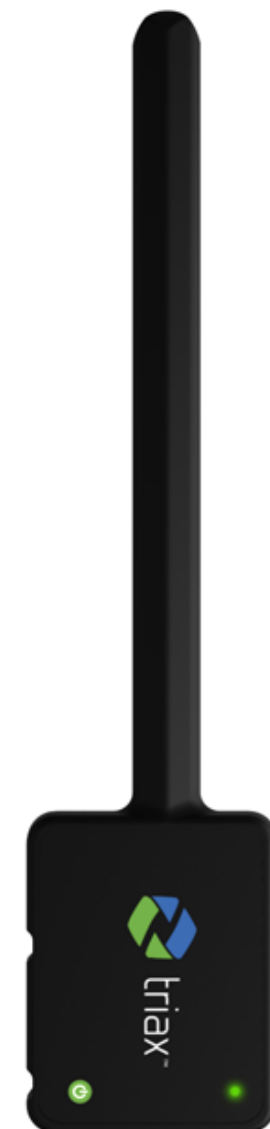
Water polo is often referred to as one of the toughest and most aggressive sports in the world. Water polo is a unique sport as the player's head is the only part of the body above the water's surface for the majority of play, which puts the ball's movement on the same plane as the player's head. This leads to the head being the most frequently impacted part of a player's body. A recent study through UC Irvine revealed that 36% of water polo players reported sustaining concussions while playing the sport.



## Objective

Our primary objective is to determine the magnitude and frequency of impacts to the head during play in water polo. Our next objective is to analyze the effectiveness of different protective headgears worn in water polo and explore new headgear designs that can prevent risk of injury.

## Testing Procedures

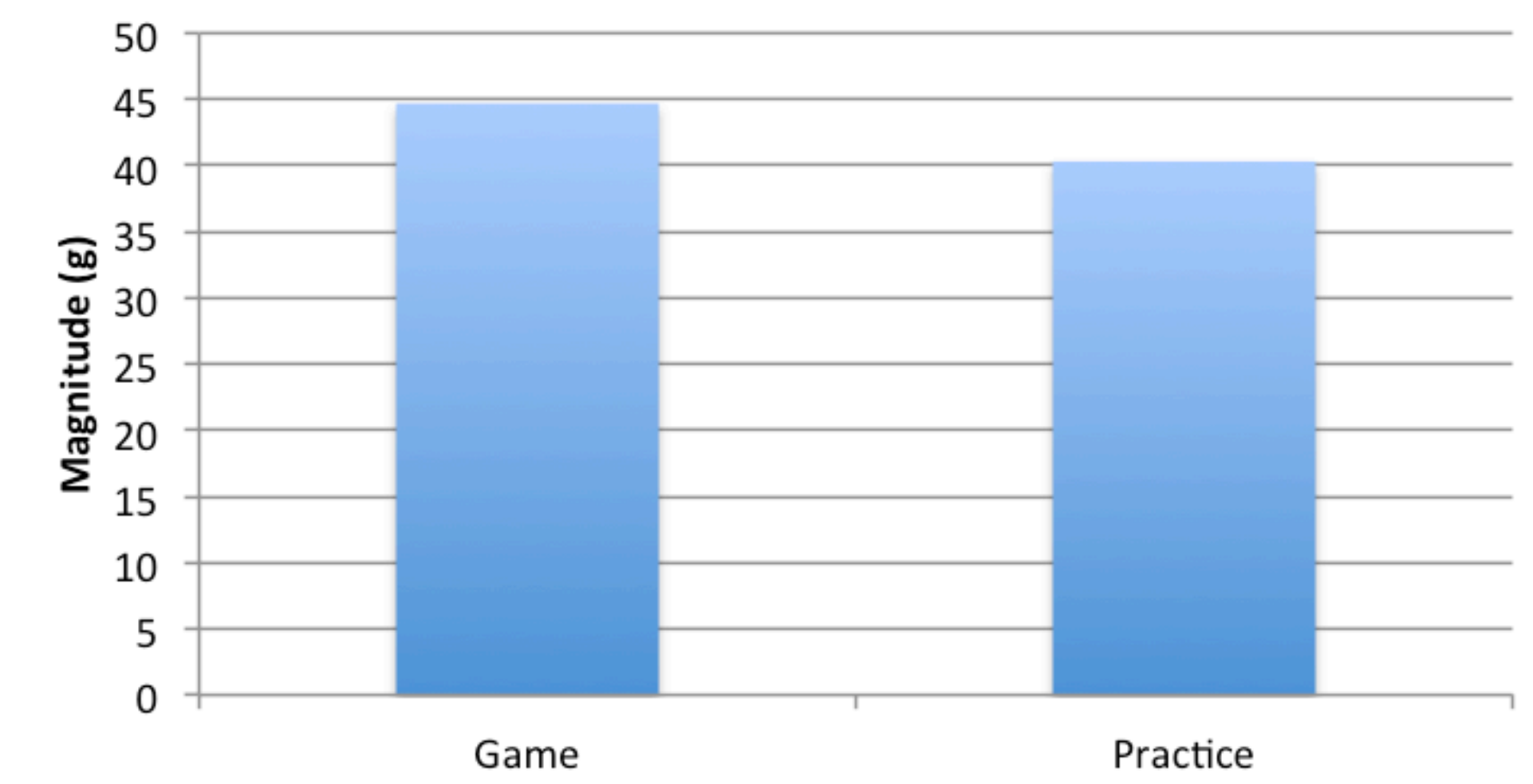


Accelerometers, made by Triax Technologies, were placed in the caps of Division I Varsity water polo players at UCI. These accelerometers measured the peak linear acceleration of head impacts caused by the ball and player-to-player interactions such as punches, kicks, elbows, and headbutts during play. Player positions were also recorded. On average, goaltenders were found to experience the highest magnitude impacts.

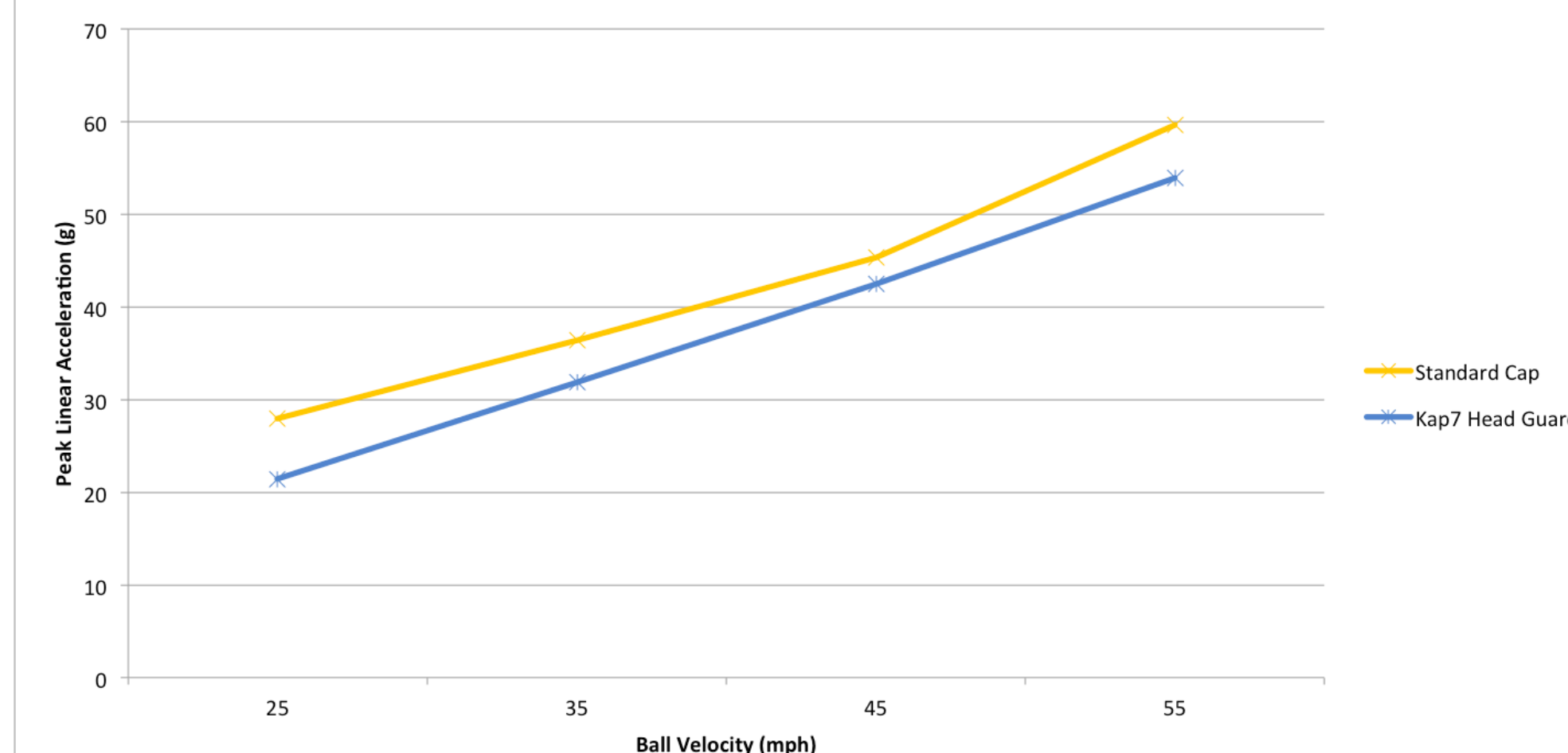
Water polo balls, kept at a constant pressure of 14 psi, were launched at a Humanetics Hybrid III test dummy head. Balls were launched at 25, 35, 45, and 55 mph while the head wore various headgears. Peak linear accelerations were measured.



### Average Impact Magnitude on Goalies



### Average Peak Linear Acceleration vs Ball Velocity



## Next Steps

Our next step is to explore the use of different materials to incorporate into water polo headgear. We aim to create a better cap that will be more effective than current products. We also have a large amount of data left to analyze from our experimentation.

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