# Does Neck Strength in Male and Female Youth Soccer Players Affect Head Velocity During Goal-Directed Heading: A Proposal

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## Introduction 1

- Head impact research in soccer has increased recently, with the intent to reduce the risk of play-related concussions
- Low neck strength and head kinematics (e.g., velocity) have been proposed as risk factors for concussions [1]
- Previous research has primarily focused on collegiate athletes [1], despite the possible increased risk for youth players due to crucial neurodevelopment occurring in this group [2]

## Purpose 2

Determine neck strength differences between male and female youth soccer players, and to quantify the relationship between heading velocities and neck strength.

## Methods 3

- Participants: male and female youth soccer players (11-13 years old)
- **Neck Strength Protocol**
  - measured using a prone push test with a hand-held dynamometer
- **Heading Protocol**
  - Five headers in the lab to the right, left, and center
  - Three retroreflective markers on participants' heads

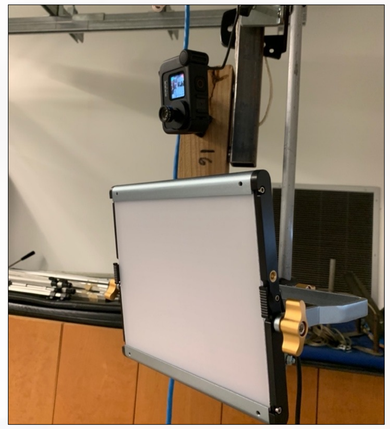

**Figure 1.** GoPro Set Up

- Five GoPro Hero 9 cameras
- ProAnalyst motion capture analysis software will be used to determine head velocities

## Expected Results 4

- Youth with lower neck strength will have increased head velocities during purposeful heading
- Females will have lower neck strength, and therefore higher head velocities in comparison to their male counterparts

**Table 1.** Expected neck strength and head velocity results.

| Sex | Neck Strength | Head Velocity |
|---|---|---|
| ♀ | ↓ | ↑ |
| ♂ | ↑ | ↓ |

## References

1. Dezman, D. et al. (2013) *Sports Health*, *5*(4), 320-326.
2. Patel, R. et al. (2005). *Sports Med.*, 35(8), 671-84.
3. Riehm, K. (2015). [Watermark]. Getty Images