



# Compression Apparel Reduces Head Impact Magnitudes in Canadian Football Athletes

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## INTRODUCTION

- Higher kinematic measurements of head impact magnitudes result in increased risk of concussion and brain strain.
- The focus of American football equipment studies is on helmet designs.
- Limited research has investigated the impact of alternative equipment.
- Objective: determine the effectiveness of a specialized compression shirt with integrated neck collar in reducing football head impact magnitudes during player collisions (Fig. 1).

## METHODS

- Helmet-mounted sensors measured linear acceleration and rotational velocity of head impacts during games.
- Collars worn by players from single football team in second half of season



Figure 1. Compression shirt with integrated neck collar from KapsulTech

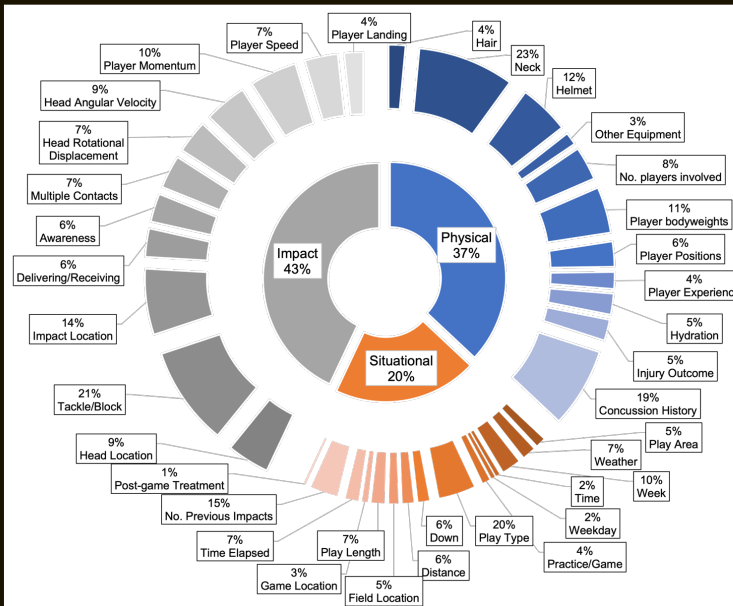


Figure 2. Multiple attribute decision-making algorithm to match head impacts with and without collar.

## METHODS CONTINUED

- Game video analyzed to extract play type, head contact, and other contextual parameters.
- Multiple attribute decision-making algorithm matched players' head impacts with and without the collar (Fig. 2).
- Data reported as median [IQR], effect sizes (ES) calculated

## RESULTS

- Total of 41 matched head impacts.
- Median linear acceleration was 13.4 g lower with collar than without ( $p < 0.001$ , large ES = 0.56, Fig 3a).
- Median rotational velocity was 211 deg/s lower with collar than without ( $p = 0.04$ , small ES = 0.27, Fig 3b).

## CONCLUSIONS

- Wearing a specialized compression shirt with integrated neck collar reduces linear acceleration and rotational velocity of head impacts experienced in football games.
- Including this equipment may improve player safety with respect to head injuries.

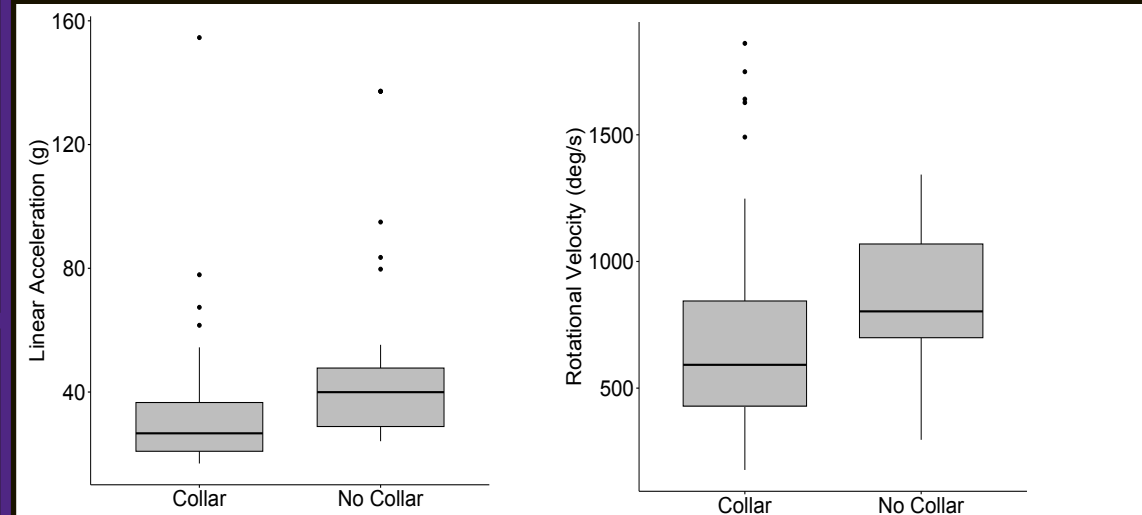


Figure 3. Left: Linear acceleration (g) measurements of head impacts with and without the collar. Right: Rotational velocity (degrees/second) measurements of head impacts with and without the collar.

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