



## AAN SPORTS CONCUSSION CONFERENCE ABSTRACT

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**Abstract Title:** Comparison of Head Impact Exposure across Common Activities in Youth Soccer

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**Objective:** The objective of this study was to compare head impact exposure across common training activities in soccer.

**Background:** Soccer is a popular youth sport in the United States, but repetitive head impacts during training may result in neurocognitive deficits. Current research has identified factors associated with increased head impact exposure in soccer, but research has yet to contextualize head impact exposure across soccer activities. Modifying practice structure may be an avenue for reducing head impact exposure and concussion risk in soccer.

**Design/Methods:** Eight U15 soccer players participated in this study for two soccer seasons. Players wore a custom instrumented mouthpiece sensor during all practices and games. On-field activities were recorded with a time-synchronized camera. Research personnel recorded the duration of all practice (e.g. technical training, team interaction) and game activities performed by each player, and film review was performed to identify all head contact events during each session. Head impact exposure was quantified in terms of peak kinematics and impacts per player per hour. The amount of time an athlete was exposed to an activity was also evaluated. Mixed effects models were used to compare peak kinematics and generalized linear models were used to compare impact rates across activity types.

**Results:** Activity types were associated with peak kinematics and impact rate. Technical training activities were associated with higher impact rates and lower mean kinematics compared to other activity types. Team interaction activities and game play were associated with the highest rotational kinematics, but the lowest impact rates. A similar number of player-to-player contact events occurred within technical training, team interaction, and game play activities.

**Conclusions:** Interventions designed to reduce head impact frequency in soccer may benefit from targeting technical training activities; whereas, interventions designed to reduce head impact magnitude may benefit from targeting team interaction and game activities.

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