Interventions (or Assessment of Risk Factors) In total 47 matches by basketball team A (9 players) and 41 matches by team B (7 players) were performed throughout the season. All training sessions and matches were executed as prescribed by the training and coaching staff without interference or manipulation.
Main Outcome Measurements The Oslo Sports Trauma Research Center (OSTRC) Questionnaire on Health Problems was used to collect data on injuries and illnesses on a weekly base. Furthermore, players filled in s-RPE and duration for each training and match. Prevalence's, severity scores, time-loss and total weekly load were compared for 1-match weeks and ≥2-match weeks. The data were analyzed using multi-level modeling.
Results Prevalence of injuries and illnesses were 18.1% and 4.6% for 1-match weeks and 17.2% and 3.3% for ≥2-match weeks. Severity scores and time-loss were not significantly different for 1-match weeks compared to ≥2-match weeks. Total weekly load was lower during ≥2-match weeks compared to 1-match weeks.
Conclusions No significant differences for injuries and illnesses were observed between 1-match weeks and ≥2-match weeks. Coaches appeared to reduce training load to compensate for multiple matches during short-term match congestion.

012 EVALUATION OF IN-EAR SENSOR SYSTEMS FOR QUANTIFYING HEAD IMPACTS IN YOUTH FOOTBALL

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Background Wearable sensor systems have the potential to quantify head kinematic responses of head impacts in football. However, on-field use of sensors (e.g. accelerometers) remains challenging due to factors such as poor coupling to the head.
Objective To test the validity of a novel in-ear sensor for quantifying head-impact exposure in youth football.
Design Descriptive laboratory study/validation study.
Setting Youth football.
Participants Six male youth football players (15.3±0.3 years).
Evaluations In step 1, the sensor was mounted to a Hybrid III headform (HIII) and impacted with a linear impactor or football (range: 9–144g). Accelerative forces, including peak linear acceleration (PLA), were obtained from both systems. In step 2, six youth soccer players wore sensors during a structured training protocol including heading and non-heading exercises; in step 3, they completed two regular football sessions. For each recorded accelerative event, PLA outputs were compared to video.
Main Outcome Measurements In step 1, random and systematic error were calculated using HIII as reference. In steps 2 and 3, mean values (±SD) were calculated for (1) all heading and (2) all non-heading events. Receiver operating characteristic curves were used to determine the sensor's discriminatory capacity in both on-field settings, and cut-off values for predicting outcomes were identified.
Results In step 1, random and systematic error were both 11% for PLA. In step 2, heading events resulted in higher absolute values (PLA=15.6±11.8g) than non-heading events (PLA=4.6±1.2g); area under the curve (AUC) was 0.98. In step 3, AUC was >0.99. A 9g cut-off value yielded a positive predictive value of 100% in the structured training protocol vs. 65% in regular football sessions.
Conclusions The in-ear sensor displayed considerable random error and overestimated head impact exposures substantially. It showed excellent on-field accuracy for discriminating headings from other accelerative events, but secondary means of verifying events are still necessary.

013 HEAD IMPACT EXPOSURE IN YOUTH FOOTBALL – ARE CURRENT INTERVENTIONS HITTING THE TARGET?

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Background Restrictions on heading in youth football have been implemented in the U.S. to limit head-impact exposure up until the age of 13. However, current interventions remain poorly guided by evidence, and providing more accurate data on heading exposure is key to assess risk.
Objective To quantify heading exposure in youth football, assessing the effects of sex and age.
Design Prospective cohort study, based on direct observation of a convenience sample of football matches played during an international youth football tournament. The tournament was played without heading restrictions, with separate sex and age groups.
Setting Youth football.
Participants Male and female teams with players aged 11–19 years. A total of 267 matches was observed.
Independent Variables Sex and age. The elite senior level was included for comparison, using video analysis.
Main Outcome Measurements All heading events were registered, classified and assigned to individual players. Heading rates were calculated for each sex and age group.
Results We observed a total of 4011 player hours (1927 player hours for females, 2083 player hours for males). Males headed more frequently than females (2.7 vs. 1.8 headers/player hour; p<0.001). Heading rates increased with age (ANOVA, p<0.001), approaching the elite senior level for players 16 years and older. There was substantial variation within teams for all age and sex groups, with the widest range (1–18 headers) observed for girls aged 19. Girls younger than 12 years had the lowest exposure, with an average of less than two players per team heading the ball, each with 1–2 headers.
Conclusions Age and sex influence head-impact exposure in youth football, and warrants careful consideration when