Setting High schools in Alberta, Canada.

Participants Female students who reported playing one of the top ten team sports for participation (i.e., baseball, basketball, lacrosse, soccer, volleyball, football, rugby, ringette, field hockey, ice hockey).

Assessment of Risk Factors

A 45-minute survey included questions regarding demographic information, sport participation, and one-year injury and concussion history.

Main Outcome Measurements Self-reported injuries sustained in the past year.

Results 51.7% (1048/2029) of high school students completing the survey were female and 481/1048 (45.9%) reported playing at least one team sport. Of these, 51.4% reported at least one sport-related injury and 8.9% at least one concussion in the past year. Injury rate based on 'most serious injury' reported was highest in ringette (42.9 injuries/100 students/year) and rugby (40.0). The top three most serious injury locations were the knee (24.7%), ankle (21.6%) and head (16.1%). The most common injury types were joint or ligament sprain (26.7%), fracture (13.0%) and concussion (11.8%). Based on all serious injuries reported in female team sports, 73.4% occurred via contact mechanisms (with someone or something). Overuse (16.2%) was the next most common mechanism reported. Of participants that reported concussion as their most serious injury, 100% were attributed to contact mechanisms (38.9% contact with someone; 61.1% contact with something).

Conclusions Team sport injury rates are high in female high school students. Specific consideration of contact injury mechanisms in female youth team sports will inform development and evaluation of targeted female contact and sport-specific prevention strategies.

238 PREVALENCE OF MENSTRUAL DISORDERS AMONG GERMAN FEMALE ELITE ATHLETES

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10.1136/bjsports-2021-IOC.220

Background A healthy menstrual cycle affects the athletic performance in training and competition. However, the prevalence of menstrual cycle disorders among elite athletes is unclear.

Objective To assess the prevalence of menstrual disorders among German female elite athletes in 2019 and 2020.

Design Retrospective cohort study.

Setting German female youth and adult elite athletes.

Participants 532 female elite athletes (19.5 ± 5.0 years; 170.0 ± 7.3 cm; 62.1 ± 11.4 kg) were included in this study. All athletes were members of the German funding for high performance sports.

Assessment of Risk Factors Menstrual disorder, sport discipline, age, BMI, body fat, training volume.

Main Outcome Measurements All athletes completed a baseline gynaecological survey. The independent samples t-test and ANOVA were used for statistical analysis (p<.05).

Results 118 of all 532 of the female athletes (22.2%) had an irregular menstrual cycle. The most prevalent menstrual disorders are oligomenorrhea (41.9%), secondary amenorrhea (25.0%), primary amenorrhea (11.3%), dysmenorrhea (4.0%), metrorrhagia (2.4%), hypermenorrhea (1.6%), polymenorrhea (0.8%) and others (12.9%). There is a significant difference in the prevalence of menstrual disorders among sport disciplines (p=.000, f=.214). The highest prevalence of menstrual disorders occurs among endurance sport athletes (30.9%). Athletes with menstrual disorders have a significantly lower BMI (p=.014, d=.258) and lower percent body fat (p=.000, d=.392) compared to athletes with normal menstrual cycles. There is no significant difference in age (p=.101, d=.172) and training volume (p=.100, d=.172) between the groups.

Conclusions Our research showed a high prevalence of menstrual disorders among German female elite athletes. The results suggest that especially athletes with low BMI and low percent body fat are at a high risk for menstrual disorders. Further research is required to investigate the effects of menstrual disorders on athletic performance and long-term health.

239 MONITORING WELLBEING AND PERCEIVED EXERTION IN RELATION TO INJURY RISK IN ELITE FEMALE FOOTBALL PLAYERS OVER 2 SEASONS

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10.1136/bjsports-2021-IOC.221

Background There is a gap in understanding how to use wellbeing and load measures in football, particularly in women.

Objective To describe the association of wellbeing and session-rating of perceived exertion (sRPE) with injury risk.

Design Prospective cohort study.

Setting Elite football team from the Spanish first division.

Participants 28 elite female players were followed during the 2017–2018 and 2018–2019 seasons.

Assessment of Risk Factors Fatigue, sleep quality, muscle soreness, stress and mood (questionnaire from 1-worst to 5-best), exposure time in training and matches, RPE (0–10) and injuries were daily recorded. Daily and 7-day rolling z-scores were calculated for wellbeing items; and rolling 7 and 28-day sums, uncoupled 7 to 28-day ratios and week-to-week changes for sRPE [time x RPE in arbitrary units (au)]. In addition, the median sRPE of each session was estimated to account for the load of sessions where injuries occurred.

Main Outcome Measurements The association of wellbeing and sRPE variables with non-contact injuries requiring 4 or more days of absence occurring on a given session was investigated using linear mixed models.

Results The probability of injury was higher in matches (1.36%) than in training (0.44%, p=0.001). In training, sessions with high median sRPE (>525 au, 0.87 vs. the rest 0.35%), high 7-day loads (>2095 au, 0.76 vs. 0.31%), low 28-day loads (<5020 au, 0.71 vs. 0.32%) and worse than usual (<-1 z-score) 7-day fatigue (0.82 vs. 0.35%) and muscle soreness (1.19 vs. 0.28%) were associated with higher injury risk (p<0.05). Moreover, pre-match worse than usual daily sleep quality (3.03 vs. 0.85%), stress (4.55 vs. 0.92%) and mood (2.74 vs. 0.95%) showed higher injury probabilities (p<0.05). Interactions between wellbeing and sRPE were also observed.