Pre-season aerobic fitness is an independent predictor of in-season injury risk in collegiate athletes

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Although aerobic fitness has been found to be related to injury risk during periods of intense training in certain populations, this relationship among collegiate athletics is unclear. **Purpose:** To determine if pre-season aerobic fitness is associated with in-season injury risk among collegiate soccer players. **Methods:** 43 NCAA Division 1 soccer athletes (male=23) completed testing prior to the start of the season for determination of lean body mass (LBM), body fat percentage (BF%), maximal aerobic capacity (VO\(_{2\text{max}}\)), ventilatory threshold (VO\(_{2\text{VT}}\)), time to exhaustion (T\(_{\text{max}}\)), and time to VT (T\(_{\text{VT}}\)). Injuries were recorded during the subsequent season, and body composition and fitness variables were compared between injured and uninjured players. Multivariate regression models were developed using gender, BF%, LBM, and VO\(_{2\text{max}}\) as covariates to predict injury during the first 4 weeks of the season and the entire season.

**Results:** Compared to uninjured players, players injured at any point during the season had lower VO\(_{2\text{max}}\) (63.4 v. 57.7 ml/kg/min, \(p=0.014\)) and T\(_{\text{max}}\) (17.2 v. 15.8 min, \(p=0.035\)) than uninjured players, but no differences were noted in age, gender, LBM or BF%. Players injured during the first 4 weeks of the season had lower LBM (56.0 v. 49.7, \(p=0.038\)) and T\(_{\text{max}}\), (16.7 v. 15.1, \(p=0.043\)) than uninjured players. For injuries occurring during the entire season, VO\(_{2\text{max}}\) remained an independent predictor of injury (\(p=0.026\)), while gender, LBM, and BF% did not. For injuries during the first 4 weeks of the season, VO\(_{2\text{max}}\) (\(p=0.039\)), gender (\(p=0.015\)), and LBM (\(p=0.002\)) were significant predictors of injury, while BF% was not. **Conclusions:** Aerobic fitness is an independent predictor of in-season injury among collegiate soccer players. Early season injuries are independently related to fitness, gender, and LBM. **Significance:** Efforts to promote aerobic fitness among elite athletes prior to the start of the season may help reduce risk of in-season injury.