±0.43 to 1.15 ±0.80). There was a significant high correlation between all cellular components in whole blood and in PRP, except RBC. Significant positive Spearman correlations were found between the concentration of PLT in whole blood and the concentration of PDGF-BB in PRP (r = 0.41; p = 0.008) and also between concentration of WBC and VEGF (r = 0.35; p < 0.05), HGF (r = 0.36; p < 0.05) in PRP. Significant positive correlation were also found between the concentration of PLT in PRP and the concentration of EGF (r = 0.59; p = 0.001), PDGF-AA (r = 0.52; p = 0.001), PDGF-BB (r = 0.49; p = 0.001), WBC in PRP and VEGF (r = 0.39, p < 0.05). Significant negative correlations were found between the concentration of RBC in PRP and the concentration of TGF-β (r = -0.43; p < 0.05), FGF-basic (r = -0.42; p < 0.05). Conclusions: The content of platelets and WBC in whole blood strongly correlates with their content in PRP, and thus with a higher content of some of the growth factors. Complete whole blood count analysis before PRP treatment may be helpful in making decision about its used.

Category: Sports Medicine

Athlete SARMs Abuse: A Systematic Review

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Summary: Athlete SARMs abuse is rapidly growing, harmful, and understudied.

Data: Introduction: Selective Androgen Receptor Modulators (SARMs) are small-molecule compounds that exert agonist and antagonist effects on androgen receptors in a tissue-specific fashion. SARMs are not FDA approved in the USA, but are readily available for purchase online. Increasingly, athletes have turned to SARMs in recent years as a means of augmenting lean muscle mass, evidenced by positive tests across multiple athletic organizations including the Olympics, NFL, NBA, UFC, and NCAA. However, the safety of SARMs for anabolic effects has not been established, and case reports associate SARMs with deleterious effects, including drug-induced liver injury, myocarditis, and tendon rupture. The purpose of this novel systematic review is to provide a comprehensive synthesis of the SARMs literature for sports medicine clinicians to understand the clinical effects, treatment protocols, prevalence, and potential contamination associated with athlete-consumed SARMs. Methods: A systematic review of the English-language literature from PubMed, Cochrane, and Embase was performed according to the PRISMA guidelines. Articles relevant to SARMs clinical outcomes, elimination profiles, contamination, safety profiles, prevalence, and doping control were included. Reviews, meta-analyses, editorials, and conference abstracts were excluded. Ostarine (Enobosarm, GTx-024, MK-2886, S-22), Ligan drol (LDG-4033, VKS211), RAD-140 (Testolone, Voasilarm), and Andarine (S-4, GTx-007) were selected as the primary focus of the systematic review, given the reported widespread recreational abuse of these specific SARM compounds. Data specific to each article type or topic (e.g. clinical study, case report, preclinical model) were extracted, assessed, and presented in tables. The heterogeneity of the study data precluded meta-analyses. Results: The literature search yielded 2012 abstracts, and a total of 72 articles from 2003 to 2022 were identified for inclusion. Notably, four of eight SARMs clinical studies reported significant increases in lean body mass (LBM). Thirteen case reports described 15 cases of SARMs abuse, all published within the last 3 years. All of the described patients were male, the median age was 32 (range, 19 – 52) years, more than half were identified as athletes (8/15), and all ingested SARMs orally for an average course of 8 weeks. Five patients explicitly denied “illicit drug use.” Athletes most commonly purchased SARMs online, and a majority of these compounds are contaminated with other substances. Athletes consumed SARMs at much higher doses than clinically studied, which may increase the risk of associated side effects such as liver injury, impaired insulin sensitivity, cardiovascular events, and tendon damage (perhaps akin to anabolic androgenic steroids in this regard). Conclusion: Athlete SARMs abuse is substantial yet unsafe, and public health oversight bodies should advocate for regulation of these gray-market compounds. Further basic science and clinical studies are warranted to validate these early reported findings regarding SARMs. The results of this systematic review serve to educate sports medicine clinicians and researchers on how to better identify, diagnose, and treat athlete SARMs abuse.

Category: Sports Medicine

Injury Rates in NCAA Student-Athletes Increased after COVID-19 Lockdowns: A Descriptive Epidemiological Study

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Summary: This study describes the epidemiology of injuries in collegiate sports at a Division I NCAA varsity institution following the onset of the COVID-19 pandemic.

Data: Background: The COVID-19 pandemic altered sports at all levels of play and led to frequent schedule changes, abbreviated seasons, and disrupted training. The unprecedented nature of the COVID-19 pandemic meant that there was no evidence-based strategy to guide a safe return to sport after a prolonged suspension of play. During the season immediately following COVID-19 lockdowns, the National Football League, Major League Baseball, and multiple European soccer leagues reported increased injury rates. However, the effect of COVID-19 precautions on National Collegiate Athletic Association (NCAA) student-athletes’ health and safety remain unknown. The purpose of this retrospective study was to address this gap in the literature by investigating the epidemiology of NCAA injuries during the 2020 season when compared to pre-COVID-19 seasons. It was hypothesized there would be an increase in overall injury rate and an increase in the number of days unavailable during the 2020 season when compared to pre-COVID-19 seasons. Methods: The injury surveillance database at a single NCAA Division I institution was queried for injuries that resulted in time loss for a student-athlete (missed game or practice), or for injuries that persisted longer than 3 days. Injuries were categorized by anatomic area. Days unavailable were recorded as total days that a student-athlete was listed as “out of activity.” Injuries and days unavailable per 1,000 athlete-exposures (AEs) were calculated for the pre-COVID-19 seasons (2017-2020) and the 2020 season. Results: Compared to the 3 pre-COVID-19 seasons, injury incidence per 1,000 AEs increased by 10.5% in the 2020 season (68.4 vs 75.6 per 1,000 AEs). Total days unavailable decreased by 20.7% in the 2020 season (1,374 vs 1,089 days per 1,000 AEs). Compared to female teams, male teams had a larger increase in injury incidence (16.4% vs 6.5%) and larger decrease in days unavailable (23.7% vs 10.75%). Among individual sports, football had the highest injury incidence during the pre-COVID-19 seasons and the 2020 season (180.4 vs 251.0 per 1,000 AEs). Volleyball had the highest increase in injury incidence (123% increase), followed by wrestling (102%). The anatomic distribution of injuries individually varied for each team and there was not a collective trend across sports during the 2020 season. Conclusion: Compared to pre-COVID-19 seasons, the incidence of injuries was higher among collegiate student-athletes at a single NCAA Division I school in the season immediately following the COVID-19 lockdown. Although the incidence of injuries increased, the number of days missed due to injury decreased. The decrease in days unavailable suggests that injury severity of the average reported injury event may have decreased. Importantly, all student-athletes did not experience the same change in injury rates, with some sports disproportionately affected. To our knowledge, this is the first study to describe the epidemiology of injuries in the post-lockdown season for collegiate student-athletes. Understanding the specific risk factors and reasons for the changes in injury characteristics allows for guided resource allocation and improved focus of prevention measures. We recommend that for the safety of student-athletes, increased caution be taken when returning to play after prolonged restrictions on athletics.

Category: Sports Medicine

Effects of Early Sports Specialization on Collegiate Basketball Players: Injury, Career Outcomes, and Gender Differences

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