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Epidemiology of Injuries in National Collegiate Athletic Association Men's Tennis: 2014–2015 Through 2018–2019

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Context: The National Collegiate Athletic Association (NCAA) has sponsored men's tennis programs since 1982. The popularity of tennis has grown, as has sponsorship of men's tennis within NCAA institutions.

Background: Continued monitoring of athletic injuries is important for identifying emerging temporal patterns.

Methods: Exposure and injury data collected in the NCAA Injury Surveillance Program during 2014–2015 through 2018–2019 were analyzed. Injury counts, rates, and proportions were used to describe injury characteristics, and injury rate ratios were used to examine differential injury rates.

Results: The overall injury rate was 4.41 per 1000 athlete-exposures. Lateral ligament complex tears of the ankle (8.5%) were the most reported injury. Trunk (15.1%) and shoulder (13.2%) injuries accounted for the largest proportions of all injuries. Noncontact and overuse were the most common mechanisms of injury among all reported injuries, together accounting for 69.4% of all injuries.

Conclusions: Findings of this study differed slightly from previous studies, most notably in specific injuries reported. Continued monitoring of specific injury incidence as well as greater participation in injury surveillance is needed to inform the development of nuanced injury prevention strategies for this population.

Key Words: collegiate, sport-related, surveillance

Key Points

- Competition injury rate was higher than the practice injury rate in NCAA Men's Tennis; competition injury rates fluctuated across the study period while practice injury rates remained stable.
- Trunk and shoulder injuries together accounted for over a quarter of all reported injuries, and nearly half of all reported injuries were strains or inflammatory conditions.
- Most injuries were classified as noncontact- or overuse-related, and ankle sprains were commonly reported.

Tennis is an international sport with 87 million players worldwide, 53% of which are men, and it is played from the recreational to highly competitive levels.[1] The United States has the highest percentage of ranking men's junior tennis players in the world, creating a competitive class of athletes who may participate in intercollegiate tennis.[1] The widespread popularity of men's tennis leads to a variety of injuries that may differ between novice and experienced tennis players.[2] Men's tennis has been included in the National Collegiate Athletic Association (NCAA) since 1946 and was sponsored by 749 institutions as of 2018–2019.[3,4] This substantial population of elite tennis athletes creates a necessity to identify injury trends at the NCAA level.

Collegiate sports injury surveillance provides team medical staff with injury level data that can inform the development and implementation of injury prevention programs.[5] The NCAA has maintained an injury surveillance system since 1982 which is now titled the NCAA Injury Surveillance Program (ISP).[5,6] Prior researchers of men's tennis teams participating in the NCAA-ISP during the 2009–2010 and 2014–2015 academic years identified an overall (time loss [TL] and nontime loss [NTL]) injury rate of 4.89 per 1000 athlete exposures (AEs) in collegiate men's tennis.[7] The incidence rate of competition injuries was higher than practice injuries in this population.[7] Prior researchers have identified the lower extremity as the most common region involved in injuries, specifically the ankle, hip, and groin.[7] The most common injuries reported were strains, sprains, and inflammation.[7] The elite tennis sphere continues to morph at high speeds in accordance with its global popularity, potentially affecting both rates of injury and types of injuries sustained. Therefore, the purpose of this study was to describe the epidemiology of tennis-related injuries captured among NCAA men tennis players between 2014–2015 and 2018–2019.

METHODS

Study Data

Men's tennis exposure and injury data collected in the NCAA ISP during the 2014–2015 through 2018–2019 athletic seasons were analyzed in this study. The methods

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Table 1. Reported and National Estimates of Injuries, Athlete Exposures (AEs), and Rates per 1000 AEs by Event Type Across Divisions[a]

	Number AEs Rate per 1000 AEs (95% CI)					
	Overall		Practices		Competitions	
Division	Reported	National Estimate	Reported	National Estimate	Reported	National Estimate
I	139	5142	81	2871	58	2272
	28 025	1299274	21 289	997591	6736	301683
	4.96 (4.14, 5.78)	3.96 (3.13, 4.78)	3.80 (2.98, 4.63)	2.88 (2.05, 3.71)	8.61 (6.39, 10.83)	7.53 (5.32, 9.75)
II	60	4240	43	2709	17	1531
	14 290	547045	10 847	388303	3444	158742
	4.20 (3.14, 5.26)	7.75 (6.69, 8.81)	3.96 (2.78, 5.15)	6.98 (5.79, 8.16)	4.94 (2.59, 7.28)	9.64 (7.30, 11.99)
III	52	6201	38	4334	14	1866
	14 579	1582402	11 458	1277944	3122	304458
	3.57 (2.60, 4.54)	3.92 (2.95, 4.89)	3.32 (2.26, 4.37)	3.39 (2.34, 4.45)	4.48 (2.14, 6.83)	6.13 (3.78, 8.48)
Overall	251	15 583	162	9914	89	5669
	56 895	3428721	43 594	2663838	13 301	764883
	4.41 (3.87, 4.96)	4.54 (4.00, 5.09)	3.72 (3.14, 4.29)	3.72 (3.15, 4.29)	6.69 (5.30, 8.08)	7.41 (6.02, 8.80)

[a] Data presented in the order of reported number, followed by AEs, estimated injury rates, and associated 95% CIs for each cross-tabulation of division and event types. Data pooled association wide are presented overall and separately for practices and competitions. National estimates were produced using sampling weights estimated based on sport, division, and year. All CIs were constructed using variance estimates calculated on the basis of reported data. A reportable injury was one that occurred due to participation in an organized intercollegiate practice or competition and required medical attention by a team certified athletic trainer or physician (regardless of time loss). Only scheduled team practices and competitions were retained in this analysis.

of the NCAA ISP have been reviewed and approved as an exempt study by the NCAA Research Review Board. Briefly, athletic trainers (ATs) at participating institutions contributed exposure and injury data using their clinical electronic medical record systems. A reportable injury was one that occurred due to participation in an organized intercollegiate practice or competition and required medical attention by a team certified AT or physician (regardless of TL). Exposures were defined as a school sanctioned event (scheduled team practices and competitions) and were reported by an AT, often because of coverage. Data from 6 (0.8%) participating programs in 2014–2015, 6 in 2015–2016 (0.8% of membership), 13 in 2016–2017 (1.7% of membership), 11 in 2017–2018 (1.5% of membership), and 33 in 2018–2019 (4.4% of membership) qualified for inclusion in analyses. Qualification criteria are detailed further in the methods.[8]

Statistical Analysis

Injury counts and rates per 1000 AEs (in which 1 AE was defined as 1 athlete participating in 1 exposure event) were assessed across levels of event type (practice, competition), competition level (Division I, Division II, Division III), season segment (preseason, regular season, postseason), and TL or NTL. Weighted and unweighted rates were estimated, and results are presented in terms of unweighted rates due to low frequencies of injury observations across levels of certain covariates unless otherwise specified. Temporal trends in injury rates across the study period were evaluated using rate profile plots stratified on the aforementioned variables. Injury counts and proportions were examined by TL, body part injured, injury diagnosis, and activity at the time of injury. Injury rate ratios (IRRs) were used to evaluate differential injury rates across event types, competition levels, and season segments. IRRs with associated 95% confidence intervals (CIs) excluding 1.00 were considered statistically significant; all analyses were conducted using SAS (version 9.4; SAS Institute).

RESULTS

A total of 251 men's tennis injuries from 56 895 AEs were reported to the NCAA ISP during the 2014–2015 through 2018–2019 athletic seasons (rate = 4.41 per 1000 AEs). This equated to a national estimate of 15 583 injuries overall (Table 1). Overall, the competition injury rate was higher than the practice injury rate (IRR = 1.80; 95% CI = 1.39, 2.33). Competition injury rates varied throughout the study period with a dramatic decrease between years 2014–2015 and 2016–2017 followed by a sharp increase in 2017–2018 that leveled in 2018–2019 (Figure A). In contrast, practice injury rates have remained relatively stable across the study period (Figure A). The overall Division I injury rate (rate = 4.96 per 1000 AEs) was higher than Division II (rate = 4.20 per 1000 AEs) and Division III (rate = 3.57 per 1000 AEs) injury rates (Table 1); statistically significant differences were observed when comparing Division I with Division III rates (IRR = 1.39; 95% CI = 1.01, 1.91). Interestingly, practice injury rates across divisions were similar (Table 1); however, the Division I competition injury rate was significantly higher than Division II and Division III (IRR = 1.74; 95% CI = 1.02, 3.00; IRR = 1.92; 95% CI = 1.07, 3.44, respectively).

Injuries by Season Segment

A total of 54 preseason injuries (national estimate: 3372), 190 regular season injuries (national estimate: 11 920), and 7 postseason injuries (national estimate: 291) were reported between 2014–2015 and 2018–2019 (Table 2). Preseason and regular season injury rates were similar (IRR = 1.30; 95% CI = 0.96, 1.76). Preseason and regular season injury rates differed between the 2014–2015 and 2016–2017 athletic seasons but became more similar during the 2017–2018 and 2018–2019 athletic seasons (Figure B). Postsea-

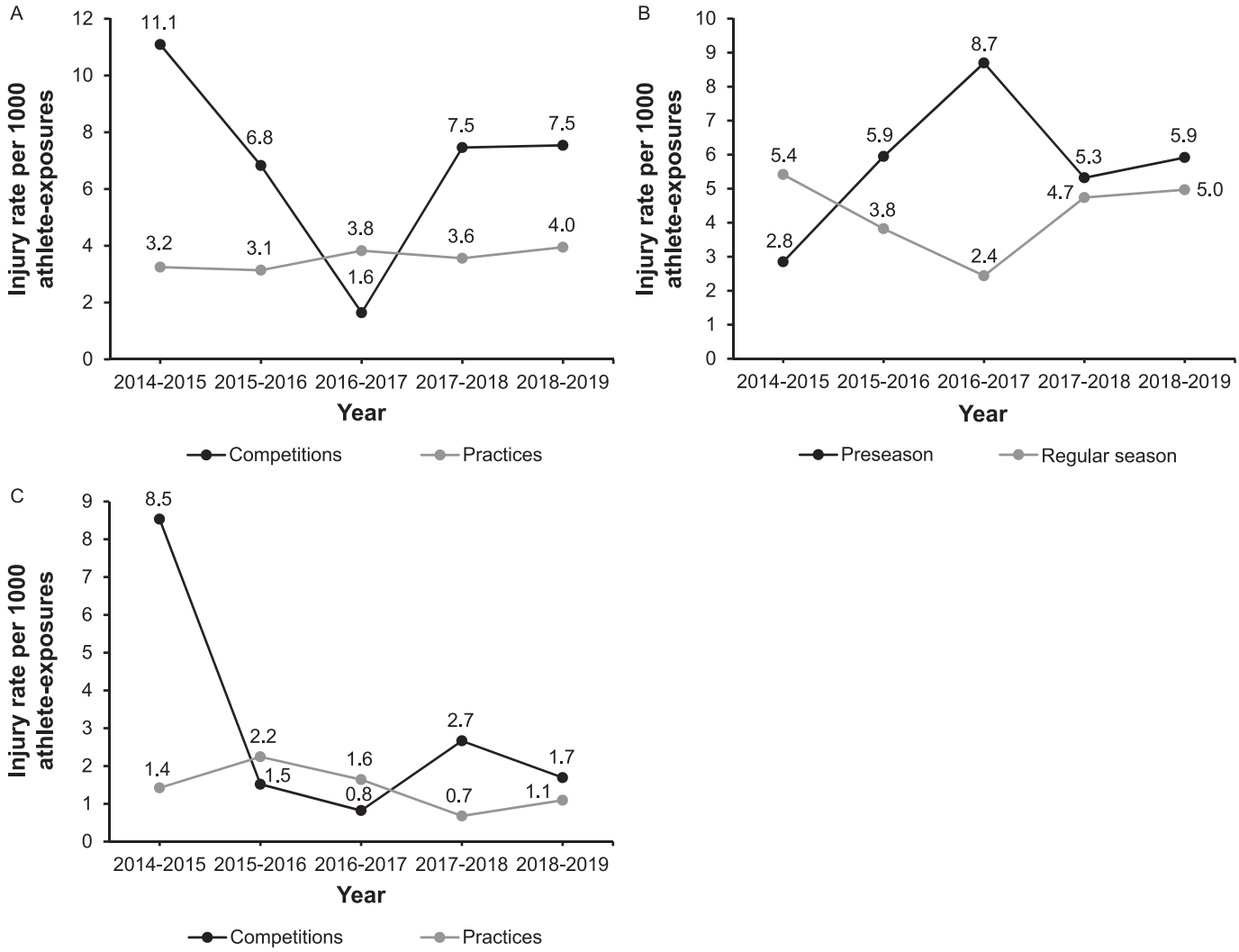

Figure. Temporal patterns in injury rates between 2014–2015 and 2018–2019. A, Overall injury rates (per 1000 athlete exposures [AEs]) stratified by event type (competitions, practices). B, Injury rates (per 1000 AEs) stratified by season segment. C, Rates of time loss injuries stratified by event type (competitions, practices; per 1000 AEs).

son rates were not calculated due to the low frequency of reported postseason injuries.

Time Loss

Approximately one-third (34.3%) of all reported injuries resulted in TL of greater than or equal to 1 day (TL was not reported in ~26% of all reported injuries). TL injuries accounted for comparable proportions of reported competition (33.7%) and practice (34.6%) injuries. Rates of competition-related TL injuries sharply decreased between 2014–2015 and 2016–2017 (most sharply during the first year), followed by a threefold increase during the following year, and a subsequent decrease thereafter. (Figure C). Practice-related TL injuries trended downward across the 5-year study period (Figure C). TL injuries were found to account for 34% of Division I injuries (NTL: 49%), 23% of Division II injuries (NTL: 25%), and 48% of Division III injuries (NTL: 35%). Across season segment, TL injuries accounted for 33% of injuries in the preseason (NTL: 33%) and 33% in the regular season (NTL: 43%).

Injury Characteristics

Trunk (15.1%) and shoulder (13.2%) injuries accounted for the largest proportions of all injuries reported during the study period. Shoulder injuries accounted for larger proportions of practice injuries (14.8%) than competition injuries (10.1%). In contrast, injury to the head or face and hip or groin accounted for larger proportions of competition injuries (5.6% and 11.2%, respectively) than practice injuries (3.1% and 7.4%, respectively). Other injuries sustained during the study period were distributed comparably in practices and competitions across the hand or wrist, trunk, thigh, knee, lower leg, and ankle (Table 3). Across both event types, 69.4% of injuries were attributed to either noncontact (35.1%) or overuse (34.3%); and noncontact and overuse injuries accounted for comparable proportions of practice- and competition-related injuries (Table 3). Contact injuries (player, surface, ball, racket, fencing, and net contact) accounted for 15.5% of all injuries. Surface contact injuries accounted for 10.4% of injuries overall and were more prevalently reported among practice injuries (11.1%) than competition injuries (9%).

Table 2. Reported and National Estimates of Injuries, Athlete Exposures (AEs), and Rates per 1000 AEs by Season Segment Across Divisions[a]

	Number AEs Rate per 1000 AEs (95% CI)			
	Preseason		Regular Season	
Division	Reported	National Estimate	Reported	National Estimate
I	23	911	110	3957
	3310	191149	22357	1013799
	6.95 (4.11, 9.79)	4.77 (1.93, 7.61)	4.92 (4.00, 5.84)	3.90 (2.98, 4.82)
II	19	1117	40	3106
	2927	117933	10394	406659
	6.49 (3.57, 9.41)	9.47 (6.55, 12.39)	3.85 (2.66, 5.04)	7.64 (6.45, 8.83)
III	12	1343	40	4857
	3190	355724	10326	1105434
	3.76 (1.63, 5.89)	3.78 (1.65, 5.90)	3.87 (2.67, 5.07)	4.39 (3.19, 5.59)
Overall	54	3372	190	11920
	9426	664806	43077	2525893
	5.73 (4.20, 7.26)	5.07 (3.54, 6.60)	4.41 (3.78, 5.04)	4.72 (4.09, 5.35)

[a] Data presented in the order of reported number, followed by AEs, estimated injury rates, and associated 95% CIs for each cross-tabulation of division and season segments. Data pooled association wide are presented overall and separately for preseason, regular season, and postseason. National estimates were produced using sampling weights estimated based on sport, division, and year. All CIs were constructed using variance estimates calculated on the basis of reported data. A reportable injury was one that occurred due to participation in an organized intercollegiate practice or competition and required medical attention by a team certified athletic trainer or physician (regardless of time loss). Only scheduled team practices and competitions were retained in this analysis.

Overall, most men's tennis injuries reported between 2014–2015 and 2018–2019 were strains (27.9%), inflammatory conditions (22.7%), and sprains (11.6%). Sprains and inflammatory conditions accounted for comparable proportions of practice- and competition-related injuries. Strains accounted for slightly higher proportions of competition injuries (30.3%) than practice injuries (26.5%). The most reported injuries during the study period were partial or complete lateral ligament complex tears of the ankle (8.4%), followed by partial or complete adductor (groin) tears (4.0%), and partial or complete hamstring tears (3.6%).

Injuries by Tennis-Specific Activities and Playing Positions

Most injuries in men's tennis between 2014–2015 and 2018–2019 occurred during general play (45%). Serving (12%) and forehand shots (6.4%) also accounted for notable proportions of all reported injuries. General play during competition resulted in greater proportions of injury (56.2%) than general play activities during practice (38.9%). Serving and forehand shots accounted for similar proportions of practice and competition injuries (Table 4).

SUMMARY

We aimed to describe the epidemiology of tennis-related injuries among NCAA men's tennis players during the 2014–2015 through 2018–2019 academic years. Examining event type differences, we observed a higher rate of competition injuries than practice injuries. Division I competition injury rates were significantly higher than Division II or III competition injury rates. The results of our study contrast with existing literature in this population. Although the overall (inclusive of both TL and NTL injuries) practice injury rate observed in our study was comparable with previous reports (TL and NTL injuries from 2009–2010 to 2014–2015), the overall (inclusive of both TL and NTL injuries) competition injury rate was markedly higher than previously observed.[7] It is difficult to contextualize the differences in injury rates observed across NCAA divisions given the dearth of existing empirical evidence related to this topic in previous reports.[7] Authors of future studies should consider investigating differential injury incidence in NCAA men's tennis across divisions. In both previous and present studies, injury counts remained low across a 5-year period, which may be resultant of a small number of participating programs, which is limited in its representativeness of all NCAA men's tennis programs. It should be noted that estimates from the latter years of the study may be more indicative of injury burden in this population given the higher number of schools participating in the ISP during the latter years (2017–2018 to 2018–2019) of the study. NCAA ISP recruitment strategies have evolved over time, and the improvements in participation reflect the success of recently employed recruitment strategies (for instance, support and communication from the NCAA Sport Science Institute). Despite this increase in the latter years of the present study, low participation and its associated implications with regard to generalizability of findings are important limitations to note while interpreting the results of the present study. Yearly practice injury rates were stable throughout the study period, whereas competition injury rates varied considerably. Tennis competitions are unique, as a player can participate in multiple events (singles, doubles, or both) for varying amounts of time. Competition injury rates presented here may not be sufficiently sensitive to these nuances of NCAA tennis as a given exposure event (used in the estimate of an AE) may consolidate these exposures, does not capture variations in match duration, and is also based on AT discretion. While the benefits of having standardized measurements of

Table 3. Distribution of Injuries by Body Part, Mechanism, and Injury Diagnosis; Stratified by Event Type[a]

	Overall		Competitions		Practices	
	Injuries Reported (%)	National Estimate (%)	Injuries Reported (%)	National Estimate (%)	Injuries Reported (%)	National Estimate (%)
Injury site						
Head/face	10 (3.98)	662 (4.25)	5 (5.62)	457 (8.06)	5 (3.09)	205 (2.07)
Shoulder	33 (13.15)	2011 (12.91)	9 (10.11)	481 (8.48)	24 (14.81)	1530 (15.43)
Arm/elbow	27 (10.76)	1630 (10.46)	6 (6.74)	557 (9.83)	21 (12.96)	1073 (10.82)
Hand or wrist	12 (4.78)	806 (5.17)	4 (4.49)	312 (5.50)	8 (4.94)	494 (4.98)
Trunk	38 (15.14)	2690 (17.26)	13 (14.61)	944 (16.65)	25 (15.43)	1746 (17.61)
Hip/groin	22 (8.76)	1184 (7.60)	10 (11.24)	522 (9.21)	12 (7.41)	661 (6.67)
Thigh	19 (7.57)	955 (6.13)	7 (7.87)	372 (6.56)	12 (7.41)	582 (5.87)
Knee	19 (7.57)	1257 (8.07)	7 (7.87)	305 (5.38)	12 (7.41)	951 (9.59)
Lower leg	17 (6.77)	1116 (7.16)	6 (6.74)	441 (7.78)	11 (6.79)	675 (6.81)
Ankle	30 (11.95)	1826 (11.72)	11 (12.36)	452 (7.97)	19 (11.73)	1375 (13.87)
Foot	14 (5.58)	1090 (6.99)	7 (7.87)	655 (11.55)	7 (4.32)	435 (4.39)
Other	10 (3.98)	357 (2.29)	4 (4.49)	170 (3.00)	6 (3.70)	187 (1.89)
Mechanism						
Noncontact	88 (35.06)	4768 (30.60)	35 (39.33)	1958 (34.54)	53 (32.72)	2810 (28.34)
Player contact	1 (0.40)	32 (0.21)	0 (0)	0 (0)	1 (0.62)	32 (0.32)
Surface contact	26 (10.36)	1491 (9.57)	8 (8.99)	423 (7.46)	18 (11.11)	1069 (10.78)
Contact with ball	3 (1.20)	265 (1.70)	2 (2.25)	218 (3.85)	1 (0.62)	47 (0.47)
Contact with racket	5 (1.99)	166 (1.07)	2 (2.25)	41 (0.72)	3 (1.85)	126 (1.27)
Contact with fencing	4 (1.59)	758 (4.86)	0 (0)	0 (0)	4 (2.47)	758 (7.65)
Overuse	86 (34.26)	5992 (38.45)	29 (32.58)	2264 (39.94)	57 (35.19)	3728 (37.60)
Other/unknown	38 (15.14)	2110 (13.54)	13 (14.61)	765 (13.49)	25 (15.43)	1344 (13.56)
Diagnosis						
Abrasion/laceration	3 (1.20)	429 (2.75)	1 (1.12)	198 (3.49)	2 (1.23)	230 (2.32)
Concussion	7 (2.79)	385 (2.47)	4 (4.49)	259 (4.57)	3 (1.85)	126 (1.27)
Contusion	6 (2.39)	441 (2.83)	1 (1.12)	124 (2.19)	5 (3.09)	317 (3.20)
Dislocation/subluxation	4 (1.59)	401 (2.57)	0 (0)	0 (0)	4 (2.47)	401 (4.04)
Entrapment/impingement	9 (3.59)	477 (3.06)	2 (2.25)	93 (1.64)	7 (4.32)	384 (3.87)
Fracture	3 (1.20)	420 (2.70)	2 (2.25)	233 (4.11)	1 (0.62)	187 (1.89)
Illness/infection/ dermatological	1 (0.40)	20 (0.13)	0 (0)	0 (0)	1 (0.62)	20 (0.20)
Inflammatory condition	57 (22.71)	3693 (23.70)	19 (21.35)	1308 (23.07)	38 (23.46)	2386 (24.07)
Spasm	13 (5.18)	684 (4.39)	1 (1.12)	97 (1.71)	12 (7.41)	587 (5.92)
Sprain	29 (11.55)	1536 (9.86)	11 (12.36)	452 (7.97)	18 (11.11)	1084 (10.93)
Strain	70 (27.89)	4432 (28.44)	27 (30.34)	1851 (32.65)	43 (26.54)	2581 (26.03)
Other	49 (19.52)	2665 (17.10)	21 (23.60)	1053 (18.57)	28 (17.28)	1612 (16.26)

[a] Data presented in the order of reported number, followed by the proportion of all injuries attributable to a given category. Data pooled across event types are presented overall and separately for practices and competitions. National estimates were produced using sampling weights estimated based on sport, division, and year. A reportable injury was one that occurred due to participation in an organized intercollegiate practice or competition and required medical attention by a team certified athletic trainer or physician (regardless of time loss). Only scheduled team practices and competitions were retained in this analysis.

exposures within the NCAA ISP allows for greater interpretation across and between sports, additional variables may need to be collected to capture competition exposures most accurately in tennis. Further consideration of this limitation as well as improvements in definitional clarity of tennis competition exposures is warranted to better describe at-risk exposure time within the sport and more precisely estimate injury incidence. When examining injury rates by season segment, although more injuries were reported during the regular season, the regular and preseason injury rates were similar. This observation differed from previous NCAA men's tennis injury surveillence.[7] Tennis participation (in particular, formal training), unlike other NCAA sports, is not regimented by season. Players can and often use a vast network of privately owned facilities and publicly owned courts.[1] Therefore, exposure classification by season segment, albeit a corollary of NCAA schedule structures, may be limited in this context.[3] Overall, TL injuries accounted for approximately one-third of all reported injuries, a decrease from previous study of this population.[7] This trend was consistent across both practice and competition. Interestingly, NTL injuries were found to account for close to 50% of Division I injuries in contrast to 25% of Division II and 35% of Division III injuries. These differences across divisions may be multifactorial in nature and resultant of variations in AT staffing and off-season training patterns.[1,9] However, it is important to note that approximately 26% of all injuries reported did not include TL information. As such, the prevalence of TL injuries may be higher than what is estimated here. More robust collection of tennis injuries with special attention to NTL injury characteristics will be critical in improving the health care provided for NCAA men's tennis participants and therefore should be a focus of future studies. Interestingly, overuse and noncontact injuries accounted for approximately 70% of all reported injuries. Juxtaposed with a low TL prevalence, this should

Table 4. Distribution of Injuries by Men's Tennis Specific Activities and Player Position[a]

	Overall		Competitions		Practices	
	Injuries Reported (%)	National Estimate (%)	Injuries Reported (%)	National Estimate (%)	Injuries Reported (%)	National Estimate (%)
Activity						
Serving	30 (11.95)	2174 (13.95)	12 (13.48)	620 (10.94)	18 (11.11)	1554 (15.67)
Volley shot	5 (1.99)	765 (4.91)	3 (3.37)	560 (9.88)	2 (1.23)	205 (2.07)
Running	7 (2.79)	379 (2.43)	1 (1.12)	20 (0.35)	6 (3.70)	359 (3.62)
Conditioning	10 (3.98)	953 (6.12)	0 (0)	0 (0)	10 (6.17)	953 (9.61)
General play	113 (45.02)	6916 (44.38)	50 (56.18)	3046 (53.73)	63 (38.89)	3870 (39.04)
Forehand shot	16 (6.37)	636 (4.08)	7 (7.87)	421 (7.43)	9 (5.56)	215 (2.17)
Backhand shot	13 (5.18)	455 (2.92)	4 (4.49)	161 (2.84)	9 (5.56)	293 (2.96)
Overhand smash shot	5 (1.99)	192 (1.23)	1 (1.12)	20 (0.35)	4 (2.47)	172 (1.73)
Drop shot	3 (1.20)	344 (2.21)	2 (2.25)	145 (2.56)	1 (0.62)	198 (2.00)
Other/unknown	49 (19.52)	2770 (17.78)	9 (10.11)	674 (11.89)	40 (24.69)	2095 (21.13)
Position						
Singles	83 (33.07)	6306 (40.47)	42 (47.19)	3532 (62.30)	41 (25.31)	2774 (27.98)
Doubles	26 (10.36)	2075 (13.32)	14 (15.73)	1001 (17.66)	12 (7.41)	1074 (10.83)
Other/unknown	142 (56.57)	7202 (46.22)	33 (37.08)	1136 (20.04)	109 (67.28)	6066 (61.19)

[a] Data presented in the order of reported number, followed by the proportion of all injuries attributable to a given category. Data pooled across event types are presented overall and separately for practices and competitions. National estimates were produced using sampling weights estimated based on sport, division, and year. A reportable injury was one that occurred due to participation in an organized intercollegiate practice or competition and required medical attention by a team certified athletic trainer or physician (regardless of time loss). Only scheduled team practices and competitions were retained in this analysis.

be further examined to better explain both the nature of TL and management of injuries within men's tennis.

The most common injury diagnoses reported in NCAA men's tennis during 2014–2015 through 2018–2019 were strains, inflammatory conditions, and sprains. These observations closely resemble previous studies of this population.[7] While strains were more common in competition, inflammatory conditions and sprains accounted for comparable proportions of practice and competition injuries in the present study. Lower extremity injuries (48%) were more prevalent among all reported injuries than upper extremity injuries (29%). Trunk injuries alone accounted for 15% of all injuries and appear to be prevalent across tennis groups, accounting for 3% to 22% of all tennis injuries.[10–12] Injury to the shoulder was the next most common site, followed by the ankle. The prevalence of injury to the shoulder and trunk, as well as the prevalence of serving and forehand activities associated with injury, is of clinical relevance. Authors of previous studies of athlete mechanics during tennis serving and forehand motions have shown a close relationship between the shoulder and trunk.[13,14] Given that approximately one-third of tennis injury mechanisms were associated with overuse pathologies, when coupled with the prevalence of trunk injuries in this population, it may be reasonable to suggest that injury to the trunk may cause disruptions in the kinetic chain, predisposing tennis athletes to other injuries in the upper and lower extremity.[15] Targeted, small-scale investigation of the relationship between overuse mechanisms and the kinetic chain may be an important avenue for further investigation given the pattern of injury observed to be associated with NCAA men's tennis athletes.

The most common specific injuries reported were partial or complete lateral ligament complex tears of the ankle, partial or complete adductor (groin) tears, and partial or complete hamstring tears. Lateral ligament complex tear of the ankle has been previously reported as the most prevalent injury in this population, though it was followed by rotator cuff strains and wrists sprains.[7] This difference in specific injury reporting may be partially attributable to participation levels in the NCAA ISP among men's tennis programs, both throughout the present study and in previous studies. Low and inconsistent participation in the surveillance program has resulted in unstable injury trends. Therefore, examinations of commonly observed injuries among NCAA men's tennis athletes are important avenues for further research. Most injuries occurred during general play and were attributable to noncontact and overuse mechanisms. Given that the ankle, groin, and hamstring were the most prevalently injured body parts, it could be surmised that these injuries may also be occurring during general play and do not involve contact. Intervention strategies that offer a protective effect against noncontact injuries, such as eccentric training, neuromuscular control, and prophylactic bracing, may be indicated, given the success of these interventions in other sports that report a high prevalence of lower extremity injuries.[16–18] Notably, the NCAA ISP does not capture preventative interventions, and therefore, this may also serve as an important avenue for future research.

Continued monitoring of NCAA men's tennis injuries is critical to maintain the health of these athletes as well as the larger population of tennis players throughout the global community. Increased and stable participation in injury surveillance will be necessary to produce consistent observations of specific injuries. The findings of the present study and continued observations will allow for more targeted studies to be developed and implemented to better understand and address the etiology of injuries sustained in NCAA men's tennis.

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