

The Evolving Treatment Patterns of NCAA Division I Football Players by Orthopaedic Team Physicians Over the Past Decade, 2008-2016

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Background: Previous studies have analyzed the treatment patterns used to manage injuries in National Collegiate Athletic Association (NCAA) Division I football players.

Hypothesis: Treatment patterns used to manage injuries in NCAA Division I football players will have changed over the study period.

Study Design: Descriptive epidemiology study.

Level of Evidence: Level 5.

Methods: The head orthopaedic team physicians for all 128 NCAA Division I football teams were asked to complete a survey containing questions regarding experience as team physician, medical coverage of the team, reimbursement issues, and treatment preferences for some of the most common injuries occurring in football players. Responses from the current survey were compared with responses from the same survey sent to NCAA Division I team physicians in 2008.

Results: Responses were received from 111 (111/119, 93%) NCAA Division I orthopaedic team physicians in 2008 and 115 (115/128, 90%) orthopaedic team physicians between April 2016 and April 2017. The proportion of team physicians who prefer a patellar tendon autograft for primary anterior cruciate ligament reconstruction (ACLR) increased from 67% in 2008 to 83% in 2016 ($P < 0.001$). The proportion of team physicians who perform anterior shoulder stabilization arthroscopically increased from 69% in 2008 to 93% in 2016 ($P < 0.0001$). Of team physicians who perform surgery for grade III posterior cruciate ligament (PCL) injuries, the proportion who use the arthroscopic single-bundle technique increased from 49% in 2008 to 83% in 2016 ($P < 0.0001$). The proportion of team physicians who use Toradol injections prior to a game to help with nagging injuries decreased from 62% in 2008 to 26% in 2016 ($P < 0.0001$).

Conclusion: Orthopaedic physicians changed their injury treatment preferences for NCAA Division I football players over the study period. In particular, physicians have changed their preferred techniques for ACLR, anterior shoulder stabilization, and PCL reconstruction. Physicians have also become more conservative with pregame Toradol injections.

Clinical Relevance: These opinions may help guide treatment decisions and lead to better care of all athletes.

Keywords: football; treatment patterns; NCAA; anterior cruciate ligament reconstruction; Toradol

Collegiate football players encounter a wide range of injuries. Kay et al¹⁴ found football to have the third highest incidence of serious injuries of 25 National

Collegiate Athletic Association (NCAA) Division I sports. These injuries have negative implications on playing time¹² and draft round when entering the National Football League (NFL).⁹

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Unfortunately for several football-related injuries, there is no definitive treatment option that is regarded as superior to all others, as data are often inconclusive.

In 2008, McCarty et al²³ surveyed NCAA Division I orthopaedic team physicians regarding their preferred treatment patterns for several common football-related injuries. However, treatment patterns can often change with advancements in medical research and technology, and these previously established treatment patterns are now outdated. Therefore, the purpose of this study was to update the literature on the treatment preferences of NCAA Division I team physicians.

METHODS

This study was exempt from institutional review board approval. The head orthopaedic team physicians for all 128 NCAA Division I football teams were asked to complete a survey containing questions regarding the experience of team physicians, medical coverage of the team, reimbursement issues, and management of common football injuries (see Appendix 1, available in the online version of this article). This survey was identical to that used in a prior study.²³ The link to the survey was sent out to each head orthopaedic team physician in an email that explained the purpose behind the study. For physicians without a known email address, alternate contacts were asked to provide the email address of the physician. The survey results were then compared with the results of the same survey sent to NCAA Division I football team physicians in 2008.

Statistical Analysis

Chi-square tests were used to determine significant differences between the results of the 2008 and 2016 surveys. A *P* value <0.05 was considered statistically significant.

RESULTS

Team Physician Demographics

Responses were received from 111 (111/119, 93%) NCAA Division I orthopaedic team physicians in 2008 and 115 (115/128, 90%) orthopaedic team physicians between April 2016 and April 2017. The proportion of team physicians who had been with their team for more than 15 years decreased over the study period (2008, 58%; 2016, 50%; *P* = 0.018). In 2008, 66% of team physicians were fellowship-trained in sports, increasing to 89% in 2016 (*P* < 0.0001). The proportion of team physicians who received a monetary stipend for providing orthopaedic coverage for their team increased nonsignificantly from 2008 (31%) to 2016 (35%; *P* = 0.51). Few team physicians in 2008 (14%) and 2016 (21%) received advertising in exchange for their services (*P* = 0.20), and few paid (either directly or indirectly) to provide coverage to the team (2008, 11%; 2016, 15%; *P* = 0.37). In 2008, 92% of team physicians reported that 2 or more physicians traveled to away games, compared with 97% in 2016 (*P* = 0.20). In addition, 27% and 38% of physicians reported that 3 or more physicians traveled to away games in 2008 and 2016, respectively (*P* = 0.20). Sixty-nine percent of team physicians

reported that an orthopaedic surgeon was the head team physician for his/her respective team in 2008, which decreased to 51% in 2016 (*P* < 0.01).

ACL Reconstruction

The proportion of team physicians who preferred a patellar tendon autograft for primary anterior cruciate ligament reconstruction (ACLR) increased from 67% in 2008 to 83% in 2016 (*P* < 0.001) (Table 1). Significantly fewer team physicians preferred to use an allograft during primary ACLR in 2016 (1%) compared with 2008 (17%; *P* < 0.01) (Table 1). The majority of team physicians in 2008 (70%) allowed return to play by 6 months after ACLR, whereas the majority of team physicians in 2016 (51%) required 7 months or longer before allowing return to play (Figure 1). The proportion of team physicians who recommended use of a functional brace after an isolated ACLR did not change significantly over the study period (2008, 65%; 2016, 64%; *P* = 0.94). Of those who recommended use of a brace, the majority continued to do so for offensive linemen (2008, 66%; 2016, 75%; *P* = 0.10) and defensive linemen (2008, 51%; 2016, 68%) (Table 2). Few team physicians recommended use of a brace for less than 6 months in 2008 (14%) or 2016 (15%; *P* = 0.75).

Anterior Shoulder Dislocation Without Bony Bankart

After closed reduction of an anterior shoulder dislocation, most team physicians had their athletes use a sling in 2008 (94%) and 2016 (95%; *P* = 0.39) (Table 3), and the majority had their athletes wear a sling for less than 2 weeks (2008, 79%; 2016, 84%; *P* = 0.39). When this injury occurred during the season and the athlete returned to play without surgery, the majority of orthopaedic team physicians had their athletes play with a harness (2008, 92%; 2016, 95%; *P* = 0.48). The proportion of team physicians who performed anterior shoulder stabilization arthroscopically increased significantly from 2008 (69%) to 2016 (93%; *P* < 0.0001). After anterior stabilization, the majority of team physicians continued to allow return to play by 6 months (2008, 94%; 2016, 96%; *P* = 0.33) (Figure 2). The proportion of team physicians who required their athletes to wear a harness after anterior stabilization increased over the study period (2008, 5%; 2016, 20%; *P* < 0.01) (Table 4).

Acromioclavicular Joint Injury

The proportion of team physicians utilizing a local anesthetic injection (eg, lidocaine/marcaine) for a type I or II acromioclavicular (AC) joint injury during a game significantly increased from 2008 (68%) to 2016 (80%; *P* = 0.045). In athletes with this injury, the majority continued to receive injection prior to games to allow play (2008, 87%; 2016, 90%; *P* = 0.52). The proportion of team physicians who injected cortisone into the AC joint during the acute/subacute period (>1 month) to decrease inflammation remained unchanged over the study period (2008, 52%; 2016, 50%; *P* = 0.68). The majority of team physicians

Table 1. Preferred graft choice for ACL reconstruction^a

Graft	2008 (N = 110)	2016 (N = 115)
Hamstring autograft	23 (21)	14 (12)
Patellar tendon autograft	74 (67)	95 (83)
Quadriceps tendon autograft	2 (2)	4 (3)
Hamstring or tibialis allograft	6 (5)	0 (0)
Achilles tendon allograft	6 (5)	1 (1)
Patellar tendon allograft	7 (6)	0 (0)
Hybrid auto/allograft	N/A ^{ab}	1 (1)

ACL, anterior cruciate ligament; N/A, not applicable.

^aData presented as n (%).

^bHybrid auto/allograft was not listed on the survey as a preferred graft choice in 2008.

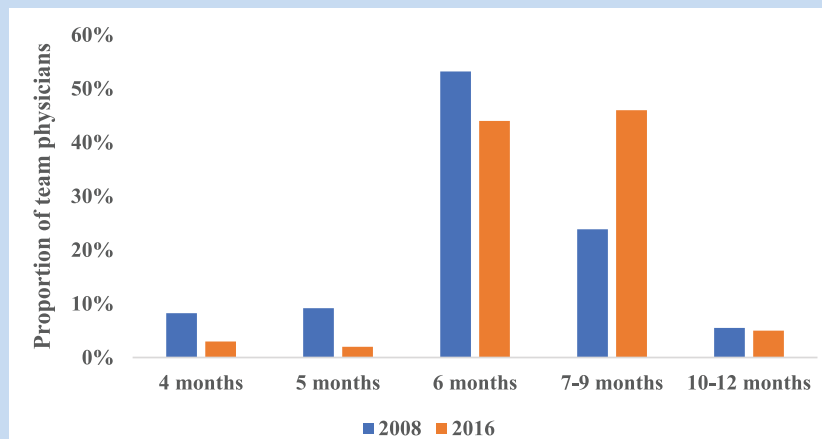


Figure 1. Return to play after anterior cruciate ligament reconstruction (ACLR). Y-axis represents the proportion of team physicians allowing return to play after primary ACLR.

Table 2. Positions that wear a brace after ACL reconstruction^a

Position	2008 (N = 107)	2016 (N = 115)
OL	71 (66)	86 (75)
RB/WR/DB	33 (31)	61 (53)
DL	55 (51)	78 (68)
LB	45 (42)	64 (56)
QB	34 (32)	66 (57)

DB, defensive back; DL, defensive lineman; LB, linebacker; OL, offensive lineman; QB, quarterback; RB, running back; WR, wide receiver.

^aTeam physicians were able to select multiple responses. Data presented as n (%).

Table 3. Use of sling after anterior shoulder dislocation^a

Duration of Sling Use After Reduction	2008 (N = 108)	2016 (N = 115)
Do not use a sling	6 (6)	6 (5)
<1 wk	38 (35)	54 (47)
1-2 wk	47 (44)	42 (37)
3-4 wk	16 (15)	11 (10)
>4 wk	1 (1)	2 (1)

^aTeam physicians were asked how long they require athletes to wear a sling after closed reduction. Data presented as n (%).

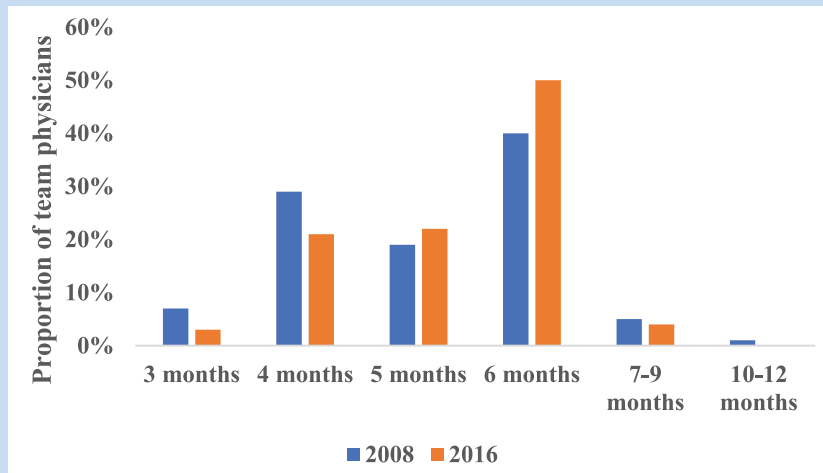


Figure 2. Return to play after anterior shoulder stabilization. Y-axis represents the proportion of team physicians allowing return to play after anterior shoulder stabilization.

Table 4. Use of harness after anterior shoulder stabilization^a

Response	2008 (N = 108)	2016 (N = 115)
Yes	5 (5)	23 (20)
No	68 (63)	62 (54)
Depends on the player's position	35 (32)	30 (26)

^aTeam physicians were asked whether they require athletes to wear a harness after anterior shoulder stabilization. Data presented as n (%).

Table 5. Treatment of type III acromioclavicular joint injuries^a

Treatment Method	2008 (N = 106)	2016 (N = 115) ^b
Treat nonoperatively	61 (58)	81 (70)
Operate only in quarterbacks	26 (25)	33 (29)
Operate in all players	19 (18)	19 (17)

^aData presented as n (%).

^bMultiple respondents recorded more than 1 answer.

preferred to treat type III AC joint injuries nonoperatively in 2008 (58%) and in 2016 (70%; $P = 0.74$) (Table 5).

Medial Collateral Ligament Bracing

The proportion of team physicians that used prophylactic medial collateral ligament (MCL) knee bracing remained high over the study period (2008, 89%; 2016, 93%; $P = 0.28$). Of those who recommended MCL bracing, most did so with offensive linemen (2008, 88%; 2016, 93%; $P = 0.36$) (Figure 3).

Posterior Cruciate Ligament Injuries

Return to play after a grade I/II posterior cruciate ligament (PCL) injury did not differ significantly between the surveys, with 40% of team physicians allowing return to play at 3 to 4 weeks in 2008 compared with 53% of team physicians in 2016 ($P = 0.31$) (Figure 4). The proportion of team physicians who preferred to use a brace on return to play increased from 2008 (64%) to 2016 (77%; $P = 0.030$). Forty percent of team physicians in 2008 and 34% in 2016 stated that they would never operate on a grade III PCL injury ($P = 0.32$) (Table 6). Of those who would operate, the

proportion who used the arthroscopic single-bundle technique for PCL reconstruction (PCLR) significantly increased from 2008 (49%) to 2016 (83%; $P < 0.0001$) (Figure 5). The majority of team physicians preferred to use an allograft for PCLR in 2008 (69%) and 2016 (64%; $P = 0.30$).

Ulnar Collateral Ligament

Elbow

Among team physicians who stated they would operate on complete elbow ulnar collateral ligament (UCL) tears, most team physicians in 2008 (68%) and in 2016 (72%; $P = 0.20$) did so in quarterbacks (Table 7). A small percentage would choose to not operate for this injury in any football players (2008, 19%; 2016, 27%, $P = 0.20$).

Thumb

Thumb UCL injuries were treated by casting and allowing return to play by 54% of team physicians in 2008 and 47% of team physicians in 2016 ($P = 0.35$). A small proportion of team physicians fixed this injury, allowed it to heal, and then allowed return to play in 2008 (6%) and in 2016 (10%).

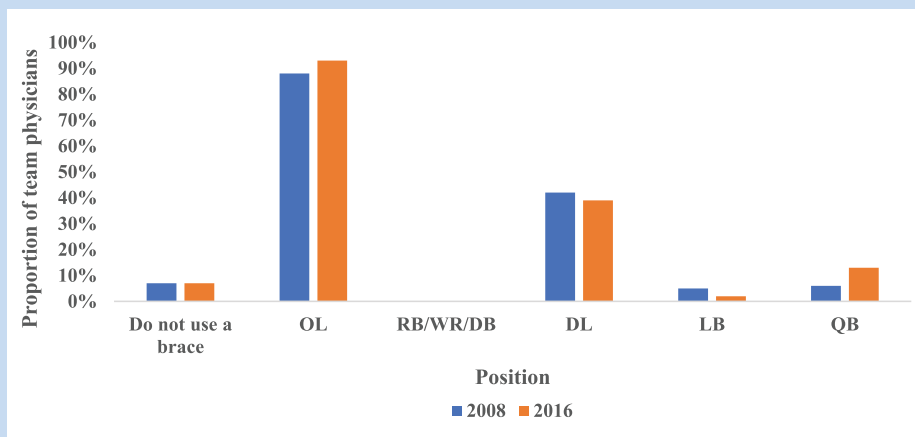


Figure 3. Field positions in which a medial collateral ligament knee brace is used. DB, defensive back; DL, defensive lineman; LB, linebacker; OL, offensive lineman; QB, quarterback; RB, running back; WR, wide receiver.

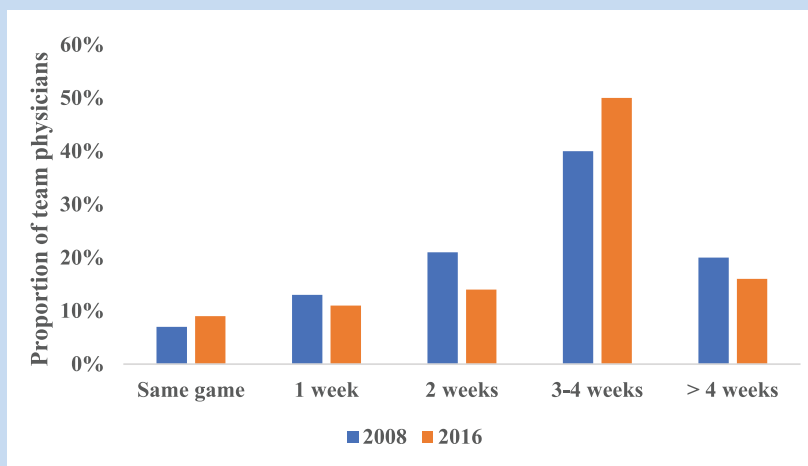


Figure 4. Time to return to play after grade I/II posterior cruciate ligament (PCL) injury. Y-axis represents the proportion of team physicians allowing return to play after a grade I/II PCL injury.

Fifth Metatarsal Fracture

Fifth metatarsal fractures were treated with screw fixation by 94% of team physicians in 2008 and 99% of team physicians in 2016 ($P = 0.044$). The majority of team physicians in 2008 (54%) allowed return to play by 6 weeks after fifth metatarsal fracture treatment, whereas the majority of team physicians in 2016 (60%) required 7 weeks or longer before allowing return to play ($P = 0.072$) (Figure 6).

Tibia Fractures

The proportion of team physicians who had not treated a tibia fracture in the previous 5 years increased slightly from 25% in 2008 to 32% in 2016 ($P = 0.82$) (Figure 7). A large proportion of team physicians continued to treat tibia fractures with intramedullary nailing (2008, 94%; 2016, 96%; $P = 0.43$). Five percent of team physicians in 2008 and 4% in 2016 had experienced nonunions after treatment of tibia fractures

Table 6. Frequency of fixing a grade III posterior cruciate ligament injury^a

Frequency	2008 (N = 101)	2016 (N = 115)
Never	40 (40)	39 (34)
One-third of the time	39 (39)	58 (50)
Two-thirds of the time	13 (13)	12 (10)
Always	9 (9)	6 (5)

^aTeam physicians were asked how often they fix isolated grade III posterior cruciate ligament injuries in football players. Data presented as n (%).

($P = 0.85$). A large proportion of team physicians did not report any history of complications after operative tibia fracture

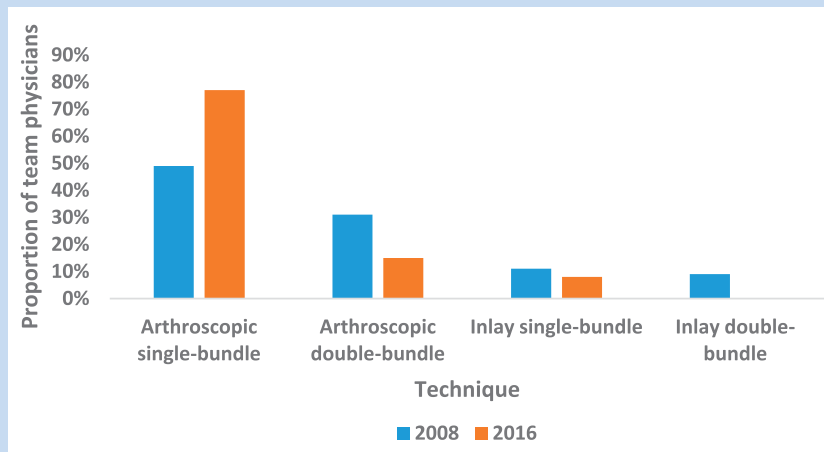


Figure 5. Technique used for posterior cruciate ligament reconstruction.

Table 7. Frequency of fixing a complete elbow ulnar collateral ligament injury^a

Position	2008 (N = 102)	2016 (N = 115)
Never fix in a football player	19 (19)	31 (27)
QB	69 (68)	83 (72)
RB/WR/DB	6 (6)	12 (10)
OL	2 (2)	11 (10)
DL	1 (1)	11 (10)
LB	3 (3)	11 (10)

DB, defensive back; DL, defensive lineman; LB, linebacker; OL, offensive lineman; QB, quarterback; RB, running back; WR, wide receiver.
^aTeam physicians were asked in which players they fix a complete elbow ulnar collateral ligament tear; they were able to select multiple responses. Data presented as n (%).

management in 2008 (94%) or 2016 (96%; $P = 0.60$). Two percent of team physicians in 2008 and 1% in 2016 preferred to remove the nail prior to returning to the football field ($P = 0.56$).

Toradol Injections

The proportion of team physicians who used Toradol (Roche) injections prior to a game to help with nagging injuries decreased from 62% in 2008 to 26% in 2016 ($P < 0.0001$). In 2008, 15% of team physicians administered an average of 5 or more injections prior to a game (Table 8). This proportion significantly decreased to 4% in 2016 ($P < 0.0001$).

DISCUSSION

This study analyzed changes and trends in the treatment patterns used to manage common injuries in NCAA Division I collegiate football players. There was an overall response rate to

this survey of 91% of NCAA Division I football team physicians in 2008 and 2016. Each NCAA Division I conference was represented in both survey responses. Responses indicated that 69% and 51% of head team physicians were orthopaedic surgeons in 2008 and 2016, respectively.

A greater proportion of orthopaedic team physicians were fellowship-trained in sports in 2016 compared with 2008. The proportion of team physicians who received a monetary stipend or advertising in exchange for their services remained consistent over the study period, as did the proportion of physicians that pay, either directly or indirectly, to provide coverage.

Injury Management

ACL Injuries

With recent rule changes in NCAA Division I football aimed at preventing concussions,³¹ the rate of lower extremity injuries, including ACL injuries, has increased.³⁶ Daruwalla et al³ found that of Division I football players undergoing ACLR, 20% were unable to return to play. In the present study, there was a greater consensus on graft choice preferences by NCAA team physicians in 2016 compared with 2008. The percentage of team physicians who preferred patellar tendon autograft increased from 67% to 83% over the study period. Additionally, only 1% of team physicians in 2016 preferred allograft compared with 17% in 2008. In 2014, Daruwalla et al³ found that 85% of NCAA Division I football players who underwent ACLR received an autograft. However, the same study³ found that 15% of players received an allograft. Recent literature has demonstrated lower rates of graft rupture with patellar tendon autograft when compared with both hamstring autograft¹⁰ and patellar tendon allograft.^{13,15,20} In addition, Daruwalla et al³ found a lower return-to-play rate for players who received an allograft compared with those who received an autograft. The authors believe this recent literature could be the motivation behind more NCAA team physicians choosing to use patellar tendon autograft.

NCAA team physicians became more conservative with their return-to-play time after ACLR over the study period. Forty-nine

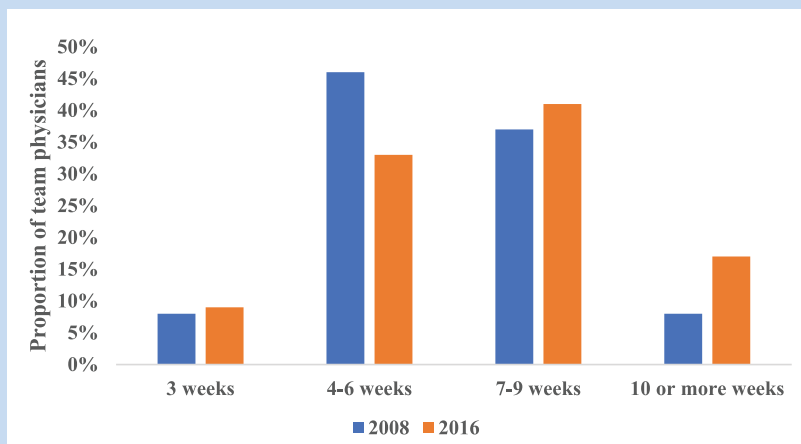


Figure 6. Return to play after fifth metatarsal fracture treatment. Y-axis represents the proportion of team physicians allowing return to play after fifth metatarsal fracture treatment.

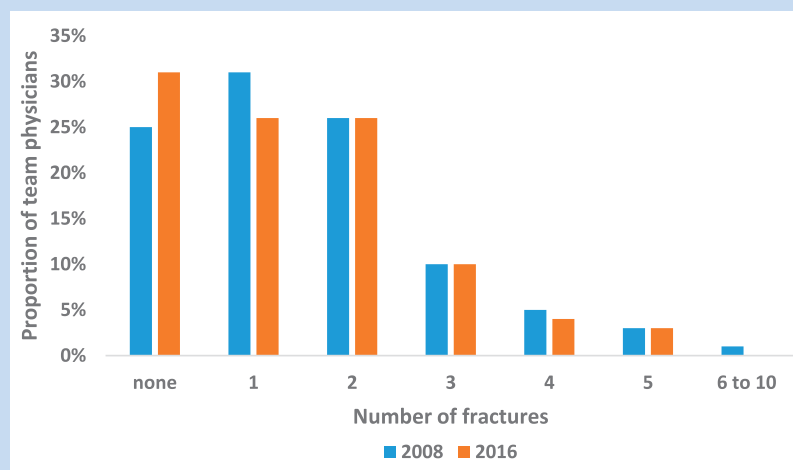


Figure 7. Number of tibia fractures encountered in the previous 5 years.

Table 8. Average number of Toradol injections administered prior to games^a

No. of Injections	2008 (N = 98)	2016 (N = 115)
0	33 (34)	84 (73)
1	17 (17)	9 (8)
2	16 (16)	11 (10)
3	12 (12)	5 (4)
4	5 (5)	1 (1)
≥5	15 (15)	5 (4)

^aTeam physicians were asked, on average, how many Toradol injections they administered to football players prior to games. Data presented as n (%).

percent of team physicians allowed return to play by 6 months in 2016, a decrease from 70% in 2008. Team physicians in 2008 most commonly allowed return to play at 6 months, whereas the most common return to play time frame in 2016 was 7 to 9 months. A small percentage of physicians waited as long as 10 to 12 months before allowing return to play. Physicians are likely postponing return to play to allow for a longer rehabilitation period to reduce the risk of reinjury. Erickson et al⁷ reported similar results to our 2016 survey responses, as they found that 55.47% of physicians allowed return to play at a minimum of 6 months. The same study⁷ also found a low percentage (12%) of physicians waiting as long as 9 months before allowing return to play.

Anterior Shoulder Dislocation

Anterior shoulder stabilization is the most common surgery performed on NCAA Division I football players.²⁵ Donohue et al⁵ found this procedure to be an effective intervention in

improving return-to-play rates and decreasing recurrent shoulder instability. However, they also found a slightly lower recurrence rate with open stabilization compared with arthroscopy.⁵ In contrast to these results, the present study found that the proportion of team physicians who preferred an arthroscopic approach for anterior shoulder stabilization increased from 69% in 2008 to 93% in 2016. The authors believe this may be due to recent advancements in arthroscopic techniques, which allow for a less invasive approach with no difference in outcomes compared with open shoulder stabilization surgery.¹¹ After stabilization surgery, the majority of team physicians (96%) allowed return to play by 6 months.

AC Joint Sprains

The majority of AC joint injuries seen in collegiate football players are low-grade, type I or II, injuries.⁶ In 2008, 68% of team physicians chose to inject a local anesthetic (eg, lidocaine/marcaine) during a game after a low-grade AC joint injury, with an even greater proportion (87%) choosing to inject prior to subsequent games to allow continued play. These numbers increased to 80% and 90%, respectively, over the study period, suggesting a more liberal approach to local anesthetic injections for AC joint injuries among NCAA team physicians.

With regard to the management of type III AC joint injuries, the proportion of team physicians who preferred to treat these injuries nonoperatively increased nonsignificantly from 58% in 2008 to 70% in 2016. Similarly, Dragoo et al⁶ examined the management of AC joint injuries in college football players and found that only 22.2% of type III AC joint injuries were treated operatively. Recent and past literature^{22,24,27} has supported nonoperative treatment as a viable option for the management of type III AC joint injuries. It is apparent that NCAA football team physicians are accepting this recommendation.

MCL Bracing

Prophylactic bracing to prevent damage to the MCL has remained a controversial topic over the years, with studies showing inconclusive or limited results as to their benefit.^{28,32} Despite this, there is widespread use of prophylactic bracing in NCAA Division I football players according to team physicians. Offensive and defensive linemen were the most common players to wear these braces. Medial collateral ligament injuries are common among all players,² but 1 study¹ found offensive and defensive linemen in college football to be more susceptible to MCL injuries than players at other positions, which could account for the widespread use of prophylactic braces in these players.

PCL Injuries

Although an uncommon injury, a slightly greater proportion of NCAA team physicians chose to manage isolated grade III PCL injuries operatively in 2016 compared with 2008. Because of better anatomical and biomechanical knowledge, LaPrade et al¹⁷ also found surgical intervention for isolated grade III PCL injuries to be an increasingly accepted practice. The proportion of team physicians who preferred an arthroscopic single-bundle

technique to all other surgical techniques for PCLR statistically increased from 2008 to 2016, despite recent studies^{26,37} demonstrating that the biomechanics of the knee are more closely re-created with a double-bundle PCLR. This may simply be due to the single-bundle technique being a less challenging technique for surgeons compared with the double-bundle technique, with no difference in clinical outcomes reported between techniques.³⁰

Elbow UCL Injuries

The proportion of NCAA football team physicians who preferred to operate on elbow UCL tears in quarterbacks remained unchanged, with most choosing to do so in both 2008 (68%) and 2016 (72%). Return to play after nonoperative treatment of UCL tears in collegiate quarterbacks has not been studied. Although successful outcomes have been demonstrated after UCL reconstruction in baseball pitchers,^{16,33} Dodson et al⁴ determined that NFL quarterbacks with this injury can be successfully treated nonoperatively.

Thumb UCL Injuries

Most team physicians in 2008 and 2016 allowed athletes with thumb UCL injuries to return to play prior to ligament healing, either by casting and allowing return to play or by fixing, casting, and allowing return to play. In a study of NFL players, individuals sustaining isolated thumb UCL tears during the season were splinted or taped and did not miss playing time due to the injury, and all players who underwent UCL reconstruction returned to play the season after surgery without limitation.³⁴ Werner et al³⁵ studied return to play after surgical reconstruction for thumb UCL injuries in college football players. No difference was found between return to prior level of play or clinical outcomes between skill position players and non-skill position players. Interestingly, skill position players had surgery sooner after injury and returned to play later than non-skill position players.³⁵

Fifth Metatarsal Injuries

A large majority of team physicians continued to treat fifth metatarsal fractures with screw fixation. Screw fixation is the suggested treatment by Fetzer and Wright,⁸ who found this to be a successful procedure, especially in high-performance athletes. In 2008, the majority of team physicians allowed return to play after treatment of fifth metatarsal fracture at 6 weeks or less. However, there was a trend to wait longer before allowing return to play over the study period, as the majority of team physicians in 2016 waited 7 weeks or longer. In 1 study,¹⁸ the mean return-to-play time for a cohort of NFL players undergoing screw fixation for fifth metatarsal fractures was 8.7 weeks, with return to play determined by clinical examination, patient symptoms, and percentage of radiographic healing.

Tibia Fractures

The majority of team physicians in 2008 and 2016 treated tibia fractures with intramedullary nailing; few had nonunions, and

few reported complications. No studies have sought to determine the efficacy of intramedullary nailing for tibia fractures in collegiate football players, although Mai et al¹⁹ determined that this treatment was successful and led to the highest rate of return to play of any orthopaedic surgical procedure in NFL players.

Toradol Injections

Fewer NCAA team physicians used Toradol injections in 2016 compared with 2008, and among those who did utilize these injections, the mean number of injections administered prior to games decreased over the study period. This same trend was noted among NFL team physicians (J. B. Schrock et al, 2017, unpublished data). In 2002, Powell et al²⁹ hypothesized that Toradol use was increasing among NCAA Division I contact athletes. Since that study, the NFL Physician Society Task Force published recommendations on the use of Toradol,²¹ most likely leading to its decreased use in both populations.

Strengths and Limitations

The strengths of this study include a large proportion of NCAA Division I team physicians surveyed. This study also analyzed changes and trends in the treatment patterns used to manage common injuries in NCAA Division I football players over an extended period of time. The main limitation of this study is that it is based solely on expert opinion rather than clinical outcomes.

CONCLUSION

Treatment patterns used by NCAA Division I football team physicians have changed over the past decade. In particular, physicians have changed their preferred techniques for ACL reconstruction, anterior shoulder stabilization, and PCL reconstruction. Physicians have also become more conservative with pregame Toradol injections. Understanding current treatment patterns and how they change with time can guide treatment decisions and lead to further research geared toward improving the treatment of athletes.

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