Among National Football League (NFL) and National Collegiate Athletic Association (NCAA) team physicians, there is no consensus on the management of various injuries. At national and regional meetings, the management of football injuries often is debated.

Given the high level of interest in the treatment of elite football players, we wanted to determine treatment patterns by surveying orthopedic team physicians. We conducted a study to determine the demographics of NFL and NCAA team physicians and to identify patterns and variations in the management of common injuries in these groups of elite football players.

Materials and Methods

The study was reviewed by an Institutional Review Board before data collection and was classified as exempt. The study population consisted of head orthopedic team physicians for NFL teams and NCAA Division I universities. The survey (Appendix),

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which included questions about team physician experience, team medical coverage, reimbursement issues, and management of common football injuries, was emailed to the head orthopedic team physicians (a paper version of the survey was mailed to those who had no known email address or who preferred a hard copy). Data were collected from May 1, 2007 through July 15, 2008.

Chi-square tests were used to determine significant differences between groups. $P < .05$ was considered statistically significant.

**Results**

Responses were received from 31 (97%) of the 32 NFL and 111 (93%) of the 119 NCAA team physicians. The 2 groups’ surveys were identical with the exception of question 3, regarding NFL division or NCAA conference.

**Team Physician Demographics**

All survey respondents were the head orthopedic physicians for their teams. Seventy-one percent were the head team physicians as well; another 25% named a primary care physician as the head team physician. Thirty-nine percent of the NFL team physicians had been a team physician at the NFL level for more than 15 years, and 58% of the NCAA team physicians had been a team physician at the Division I level for more than 15 years. Eighty-one percent of NFL and 66% of NCAA team physicians had fellowship training in sports medicine. For away games, 10% of NFL vs 65% of NCAA teams traveled with 2 physicians; 90% of NFL and 28% of NCAA teams traveled with 3 or more physicians.

Only a small percentage of respondents (NFL, 10%; NCAA, 14%) indicated they had received advertising in exchange for services. Most respondents (NFL, 93%; NCAA, 89%) did not pay to provide team coverage. In contrast, 97% of NFL vs only 31% of NCAA physicians indicated they received a monetary stipend for providing orthopedic coverage.

**Anterior Cruciate Ligament Reconstructions**

Eighty-seven percent of NFL and 67% of NCAA respondents indicated that patellar tendon autograft was their preferred graft choice (Table 1).
The percentage of NCAA physicians who allowed return to football 6 months or less after anterior cruciate ligament (ACL) reconstruction was significantly ($P = .03$) higher than that of NFL physicians (Figure 1).

**Anterior Shoulder Dislocations (Without Bony Bankart)**

Sling use after reduction of anterior shoulder dislocation was varied, with most physicians using a sling 2 weeks or less (Table 2).

Ninety-three percent of the team physicians in each group had athletes play with a harness when they returned from an in-season injury. For anterior stabilization, most team physicians (NFL, 79%; NCAA, 69%) performed arthroscopic repair. A minority indicated that, after anterior stabilization, they always required use of a harness; a higher proportion based their decision on the player’s position (Table 3).
Return to contact was similarly allowed by both groups, and 90% allowed return to contact within 4 to 6 months (Figure 2).

**Acromioclavicular Joint Injuries**

Roughly two-thirds of respondents (NFL, 60%; NCAA, 69%) indicated that, during a game, they managed acute acromioclavicular (AC) joint injuries (type I/II) with injection of a local anesthetic that allowed return to play. In addition, a majority (NFL, 90%; NCAA, 87%) indicated they gave such athletes pregame injections that allowed them to play. About half the physicians (NFL, 57%; NCAA, 52%) injected the AC joint with cortisone during the acute/subacute period (<1 month) to decrease inflammation.

No significant difference was found between the 2 groups in terms of proportion of surgeons electing to treat type III AC joint injuries operatively versus nonoperatively (Table 4).
Medial Collateral Ligament Injuries

There was a significant ($P < .0001$) difference in use of prophylactic bracing for medial collateral ligament (MCL) injuries (NFL, 28%; NCAA, 89%).

![ajo04509319e_f3.JPG](image)

Bracing was most commonly used in offensive linemen (Figure 3).

Posterior Cruciate Ligament Injuries

The percentage of physicians who allowed athletes to return to play after a grade I/II posterior cruciate ligament (PCL) injury was significantly ($P = .01$) higher in NFL physicians (22%) than in NCAA physicians (7%). The amount of time varied up to more than 4 weeks (Figure 4).

![ajo04509319e_f4.JPG](image)

When athletes returned to play after a grade I/II PCL injury, significantly ($P < .01$) more NCAA physicians (64%) than NFL physicians (37%) required bracing.

![ajo04509319e_t5.JPG](image)
Physicians varied in their responses about how often grade III PCL injuries would be managed (Table 5). Both groups’ preferred method of operative repair was the arthroscopic single-bundle technique (Figure 5).

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**Elbow Ulnar Collateral Ligament Tears**

A majority of respondents indicated they would treat a complete elbow ulnar collateral ligament (UCL) tear in a quarterback; a much smaller percentage preferred operative repair in athletes playing other positions (Table 6).

**Thumb Ulnar Collateral Ligament Tears**

For athletes with in-season thumb UCL tears, 63% of NFL and 54% of NCAA physicians indicated they cast the thumb and allowed return to play. Others recommended operative repair and either cast the thumb and allowed return to play (NFL, 30%; NCAA, 41%) or let the thumb heal before allowing return to play (NFL, 7%; NCAA, 5%).

![ajo04509319e_t6.JPG](ajo04509319e_t6.JPG)
Fifth Metatarsal Fractures

For a large majority of physicians (NFL, 100%; NCAA, 94%), the preferred treatment for fifth metatarsal fractures was screw fixation.

![Figure 6](ajo04509319e_f6.JPG)

The percentage of physicians who allowed return to play by 6 weeks was significantly ($P < .01$) higher in NCAA (55%) than NFL (24%) physicians (Figure 6).

Tibia Fractures

In the 5-year period before the survey, 43% of NFL and 75% of NCAA physicians managed at least one tibia fracture ($P < .001$) (Figure 7).

![Figure 7](ajo04509319e_f7.JPG)

The treatment preferred by all NFL physicians and 96% of NCAA physicians was intramedullary nailing. Only 2 respondents, both in the NCAA, removed the nail before allowing return to play. Five physicians, all in the NCAA, reported nonunions occurring after tibia fractures. Reported complications (NFL, 8%; NCAA, 13%) included 4 cases of fatty embolism, 1 death, infection, compartment syndrome, muscular contracture, and persistent pain.

Ketorolac Injections

Intramuscular ketorolac injections were frequently given to elite football players, significantly ($P < .01$) more so in the NFL (93%) than in the NCAA (62%). The average number of injections varied among physicians, though a
significantly ($P < .0001$) higher percentage of NFL (79%) than NCAA (13%) physicians gave 5 or more injections per game.

**Discussion**

This survey on managing common injuries in elite football players had an overall response rate of 94%. All NFL divisions and NCAA conferences were represented in physicians’ responses. Ninety percent of NFL and 65% of NCAA head team physicians were orthopedists. These findings differ from those of Stockard\(^1\) (1997), who surveyed athletic directors at Division I schools and reported 45% of head team physicians were family medicine-trained and 41% were orthopedists.

Given the high visibility of team coverage and the economics of college football’s highest division, one might expect team physicians to receive financial remuneration. This was not the case, according to our survey: Only 30% of physicians received a monetary stipend for team coverage, and only 14% received advertising in exchange for their services. Twelve NCAA team physicians indicated they pay to be allowed to provide team coverage.

**Injury Management**

**Anterior Cruciate Ligament Injuries.** For NFL and NCAA team physicians, the preferred graft choice for ACL reconstruction was patellar tendon autograft. This finding is similar to what Erickson and colleagues\(^2\) reported from a survey of NFL and NCAA team physicians: 86% of surgeons preferred bone–patellar tendon–bone (BPTB) autograft. However, only 1 surgeon (0.7%) in that study, vs 16% in ours, preferred allograft. Allograft use may be somewhat controversial, as relevant data on competitive athletes are lacking, and it has been shown that the graft rupture rate\(^3\) is higher for BPTB allograft than for BPTB autograft in young patients. However, much of the data on higher failure rates with use of allograft in young patients\(^4,5\) has appeared since our data were collected.

Our return-to-play data are similar to data from other studies.\(^2,6\) According to our survey, the most common length of time from ACL reconstruction to return to football was 6 months, and 94% of team physicians allowed return to football by 9 months. In the survey by Erickson and colleagues,\(^2\) 55% of surgeons waited a minimum of 6 months before returning athletes to play, and only 12% waited at least 9 months. In the study by Bradley and colleagues\(^6\) (2002), 84% of surgeons waited at least 6 months before returning athletes to play. Of note, we found a significantly higher percentage of NCAA football players than NFL players returning within 6 months after surgery. The difference may be attributable to a more cautious approach being taken with NFL players, whereas most NCAA players are limited in the time remaining in their football careers and want to return to the playing field as soon as possible.

**Shoulder Dislocations.** Responses to the 5 survey questions on anterior shoulder dislocation showed little consensus with respect to management. The exception pertained to use of a harness for in-season return to play with a dislocation—92% of physicians preferred management with a harness. Of note, 7 of 10 team surgeons performed anterior stabilization through an arthroscopic approach. Despite historical recommendations to perform open anterior stabilization in collision athletes, NFL and NCAA physicians’ practice patterns have evolved.\(^7\) Although return to contact activity was varied among responses, 94% of physicians allowed return to contact within 6 months.

**Acromioclavicular Joint Injuries.** For college football players, AC joint injuries are the most common shoulder injuries.\(^8\) In the NFL Combine, the incidence of AC joint injuries was 15.7 per 100 players.\(^8\) Several studies have
cited favorable results with nonoperative management of type III AC joint injuries. Nonoperative management was the preferred treatment in our study as well, yet 26% of surgeons still preferred operative treatment in quarterbacks. Opinions about operative repair of type III injuries in overhead athletes vary, but nonoperative management clearly is the preferred method for elite football players. A 2013 study by Lynch and colleagues found that only 2 of 40 NFL players with type III AC joint injuries underwent surgery.

For type I and II AC joint injuries that occur during a game, more than two-thirds of the NCAA team physicians in our study favored injecting a local anesthetic to reduce pain and allow return to play in the same game. An even larger majority indicated they gave a pregame injection of an anesthetic to allow play. Similar use of injections for AC joint injuries has been reported in Australian-rules football and rugby. Whether bracing is prophylactic against MCL injuries is controversial. Some studies have found it effective. According to our survey, 89% of Division I football teams used prophylactic knee bracing, mainly in offensive linemen but frequently in defensive linemen, too. No schools used bracing in athletes who played skill positions, except quarterbacks. Six schools used bracing on a quarterback’s front leg.

The percentage of teams that used prophylactic MCL bracing was significantly higher in the NCAA than in the NFL. NCAA team physicians generally have more control over players and therefore can implement widespread use of this bracing.

Posterior Cruciate Ligament Injuries. These injuries are infrequent. According to Parolie and Bergfeld, only 2% of college football players at the NFL Combine had a PCL injury. Treatment in athletes remains controversial. Our survey showed physicians’ willingness to return players to competition within 4 weeks after grade I/II PCL injuries. There is no consensus on management or on postinjury bracing. In operative cases, however, the preferred graft is allograft, and the preferred repair method is the arthroscopic single-bundle technique. These findings mirror those of a 2004 survey of the Herodicus Society by Dennis and colleagues. Elbow Ulnar Collateral Ligament Tears. In throwing athletes with UCL tears, operative treatment has been recommended. A majority of our survey respondents preferred operative treatment for quarterbacks. However, operative treatment is still controversial, and quarterbacks differ from baseball players in their throwing motions and in the stresses acting on the UCLs during throwing. Two systematic reviews of UCL reconstruction have affirmed the positive outcomes of operative treatment in throwing athletes. However, most of the studies covered by these reviews focused on baseball players. In athletes playing positions other than quarterback, these injuries were typically treated nonoperatively.

Thumb Ulnar Collateral Ligament Tears. Our survey respondents differed in their opinions on treating thumb UCL tears. About half recommended cast treatment, and the other half recommended operative treatment. Previous data suggest that delaying surgical treatment may be deleterious to the eventual outcome. Fifth Metatarsal Fractures. For fifth metatarsal fractures, screw fixation was preferred by 90% of our survey respondents—vs 73% of NFL team physicians in a 2004 study by Low and colleagues. What remains controversial is the length of time before return to play. Our most frequent response was 4 to 6 weeks, and 46% of our respondents indicated they would wait 7 weeks or longer. These times differ significantly from what Low and colleagues reported: 86% of their physicians allowed return to competition after 6 to 12 weeks.

Tibia Fractures. Management of tibia fractures in US football players has not been reported. Chang and colleagues described 24 tibial shaft fractures in UK soccer players. Eleven fractures (~50%) were treated with intramedullary nails, 2 with plating, and 11 with conservative management. All players returned to activity, the operative group at 23.3 weeks and the nonoperative group at 27.6 weeks. Our respondents reported treating at least 150 tibial shaft fractures in the 5-year period before our survey, demonstrating the incidence and importance.
of this type of injury. A vast majority of team surgeons (96%) opted for treatment with intramedullary nailing. This choice may reflect an ability to return to play earlier—the ability to move the knee and maintain strength in the legs. Some have suggested it is important to remove the nail before the player returns to the football field, but this was not common practice among our groups of team surgeons. Other studies have not found any advantage to tibial nail removal.\textsuperscript{27} Ketorolac Injections. Authors have described using ketorolac for the treatment of acute or pregame pain in professional football players.\textsuperscript{28-30} According to a 2000 survey, 93% of NFL teams used intramuscular ketorolac, and on average 15 players per team were treated, primarily on game day. Our survey found frequent use of ketorolac, with almost two-thirds of team orthopedists indicating pregame use. Ketorolac use was popular, particularly because of its effect in reducing postoperative pain and its potent effect in reducing pain on game day. However, injections by football team physicians have declined significantly in recent years, ever since an NFL Physician Society task force published recommendations on ketorolac use.\textsuperscript{31}

**Conclusion**

There is a wide variety of patterns in treating athletes who play football at the highest levels of competition. Our findings can initiate further discussion on these topics and assist orthopedists providing game coverage at all levels of play in their decision-making process by helping to define the standard of care for their injured players.

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**Key Info**

**Figures/Tables**

**References**

**References**


**Multimedia**
Product Guide

Product Guide

- Med4 Elite
- GRPro 2.1
- Shoulder Wrap
- Knee Wrap

Citation

Eric C. McCarty MD; Matthew J. Kraeutler MD; Paula Langner MS; Shane Cook MD; Byron Ellis MD; Jenna M. Godfrey MD Mph. Historical Patterns and Variation in Treatment of Injuries in NFL (National Football League) Players and NCAA (National Collegiate Athletic Association) Division I Football Players. *Am J Orthop.* 2016 September;45(6):E319-E327

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