

Treatment Decisions in Pediatric Sports Medicine

Do Personal and Professional Bias Affect Decision-Making?

Zachary S. Stinson,^{*†} MD, Cassidy M. Foley Davelaar,[†] DO, Gary M. Kiebzak,[†] PhD, and Eric W. Edmonds,[‡] MD

Investigation performed at Nemours Children's Hospital, Orlando, Florida, USA

Background: Personal and professional biases can affect decision-making regarding important issues in pediatric sports medicine. Gaining insight into the opinions of health care professionals who specialize in pediatric sports medicine will provide information that may be useful for directing ongoing research in this field.

Hypothesis: It was hypothesized that surgeons would demonstrate bias toward early surgical intervention versus nonsurgeons. In addition, it was hypothesized that youth sports medicine professionals who were parents of a child with a previous major sports injury or concussion would be less likely to allow their child to play American tackle football or return to football after a concussion.

Study Design: Cross-sectional study.

Methods: An online survey was provided to the active members of the Pediatric Research in Sports Medicine Society. We used both professional background information and responses to questions related to personal experiences with youth sports injuries to determine potential factors associated with underlying biases. Survey responses among subgroups were compared using the Fisher exact test. The Pearson correlation coefficient was used to evaluate years in practice versus opioid use.

Results: Of the survey participants, 62.5% were pediatric surgeons, and 37.5% represented different nonsurgical youth sports medicine professions. Surgeons were less likely than nonsurgeons to agree to allow their child to return to football after sustaining a concussion and completing a concussion protocol (48% vs 76%, $P = .013$). Surgeons were more likely than nonsurgeons to agree to both elective shoulder stabilization after a first-time dislocation and elective drilling of a stable knee osteochondritis dissecans (OCD) before nonoperative treatment (41% vs 10%, $P = .003$ and 52% vs 23%, $P = .013$, respectively). Those who reported having a child with a concussion history were more likely to support him or her returning to football after a concussion (65% vs 33%, $P = .026$).

Conclusion: Surgeons were more likely to favor elective shoulder-stabilization surgery after a first-time dislocation and drilling of a stable knee OCD instead of nonoperative management. Personal experience of having a child who sustained a major sports injury or concussion did not demonstrate a bias against participation in football or return to football after a concussion.

Keywords: youth sports; concussion; OCD; sports specialization

Youth sports popularity and culture in the United States have changed dramatically over the past few decades. Currently, over 44 million children aged 5 to 18 years participate in organized sports in the United States.²⁰ With participation trends changing, sports specialization on the rise, and the decline of the multisport athlete, there has been an associated increase in the incidence of youth sports-related injuries.⁴⁰ Therefore, it has become increasingly important to investigate how to best counsel parents

and young athletes on safe youth sports participation, especially with regard to early sports specialization, age-appropriate participation on club and travel teams, and participation in American tackle football. In addition, there are several youth sports injuries that present challenges in treatment decision-making because of limited evidence specific to the treatment of these injuries in pediatric patients at various stages of growth and development. This includes management of first-time shoulder dislocations, anterior cruciate ligament (ACL) tears, osteochondritis dissecans (OCD) lesions, patellar dislocations, and concussions.

Among pediatric physicians, there is variation in specialization (sports medicine compared with orthopaedic sports

The Orthopaedic Journal of Sports Medicine, 9(10), 23259671211046258
DOI: 10.1177/23259671211046258
© The Author(s) 2021

This open-access article is published and distributed under the Creative Commons Attribution - NonCommercial - No Derivatives License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits the noncommercial use, distribution, and reproduction of the article in any medium, provided the original author and source are credited. You may not alter, transform, or build upon this article without the permission of the Author(s). For article reuse guidelines, please visit SAGE's website at <http://www.sagepub.com/journals-permissions>.

medicine) that may cause differences in opinion regarding youth sports injury management. Likewise, nonphysician health care professionals such as physical therapists and athletic trainers may carry alternative perspectives on the benefits and dangers associated with youth sports. Additionally, youth sports medicine professionals may have inherent biases based on personal experiences with youth sports participation that may affect decision-making.

By investigating the current opinions of those who treat and have intimate knowledge of youth sports injuries among multiple disciplines, we may gain more clear and obvious answers to the topics above. Furthermore, we hoped to identify where future research efforts should be directed and where the influence of personal and professional bias on these topics should be carefully considered. To achieve these objectives, a survey on several different topics associated with youth sports medicine injuries and participation was provided to members of the Pediatric Research in Sports Medicine Society (PRiSM). Our hypothesis was that surgeons would demonstrate bias toward early surgical intervention versus nonsurgeons and that respondents who were parents of a child with a previous major sports injury or concussion would be less likely to allow their child to play American tackle football or return to football after a concussion.

METHODS

This study was determined to be exempt from institutional review board approval. A 16-question, respondent-anonymous survey on pediatric sports medicine topics was electronically distributed to all active members of the PRiSM on 2 separate occasions, in June and August 2019, respectively (Appendix Figure A1). The survey topics were based on youth sports participation and injury management questions commonly encountered by youth sports medicine professionals and represent some of the most active areas of research in pediatric sports medicine, as demonstrated by the frequency of these topics associated with research presentations at the 2021 PRiSM Annual Meeting (pediatric ACL tears, patellofemoral instability, concussion, early sports specialization, and use of opioids were the most common topics). PRiSM membership includes physicians in the fields of orthopaedic surgery, sports medicine, family practice, radiology, physical medicine and rehabilitation, and pediatrics, as well as physical therapists, athletic trainers, advanced practice providers, and research scientists who are interested in pediatric sports medicine.

Presurvey questions were gathered regarding information on the type of profession, years in practice, personal experience with having children involved in youth sports, and personal experience with children who have sustained a major injury or concussion while participating in youth sports. A major injury was defined as an injury that required surgery or ended a season. The question regarding type of profession offered the answer choices of orthopaedic surgeon, nonoperative physician, physical therapist, athletic trainer, or physician assistant. Of the active PRiSM nonstudent members, 209 members matched one of these professional categories, with a majority of this group being represented by orthopaedic surgeons (49%), followed by nonoperative physicians (40%), physical therapists (6%), athletic trainers (4%), and advanced practice providers (1%). After the presurvey multiple-choice questions, all remaining questions had binary (yes/no) answer choices.

Respondents were asked to answer the questions by choosing how they would respond if the question were being asked with respect to their own child or loved one. Data were collected using Survey Monkey (www.SurveyMonkey.com). Survey responses were included in the data analysis if the respondent answered any or all of the 16 questions. Survey responses (percentages) among the subgroups (profession, years in practice, and personal experiences) were compared using the Fisher exact test. The Pearson correlation coefficient (r) was used to evaluate years in practice versus opioid use. Statistical significance was set at $P < .05$. All statistics were performed using InStat3 (GraphPad Software).

RESULTS

A total of 96 PRiSM members participated in the study, 46% of the 209 possible members who fit into the survey profession types. Of the survey respondents, the type of profession included 6 (6.25%) athletic trainers, 24 (25%) nonoperative physicians, 60 (62.5%) orthopaedic surgeons, 6 (6.25%) physical therapists, and 0 advanced practice providers (physician assistants) (Figure 1). The distribution of survey participation by profession was consistent with the current PRiSM membership, where surgeons represent a majority of the membership, followed by nonoperative physicians. Completion of all 16 questions was performed by 88 participants (92.0%).

Provider Experience

Years of professional experience was evenly distributed among the group, with 29% of participants having less than

*Address correspondence to Zachary S. Stinson, MD, Nemours Children's Hospital, 6535 Nemours Pkwy, Orlando, FL 32827, USA (email: zachary.stinson@nemours.org) (Twitter: @pedisportsdoc).

[†]Nemours Children's Hospital, Orlando, Florida, USA.

[‡]Rady Children's Hospital, San Diego, California, USA.

Final revision submitted April 16, 2021; accepted June 8, 2021.

One or more of the authors has declared the following potential conflict of interest or source of funding: Z.S.S. has received education payments from Arthrex and hospitality payments from Stryker. E.W.E. has received speaking fees from Arthrex. AOSSM checks author disclosures against the Open Payments Database (OPD). AOSSM has not conducted an independent investigation on the OPD and disclaims any liability or responsibility relating thereto.

Ethical approval for this study was waived by Nemours Children's Hospital (ref. No. 1479194).

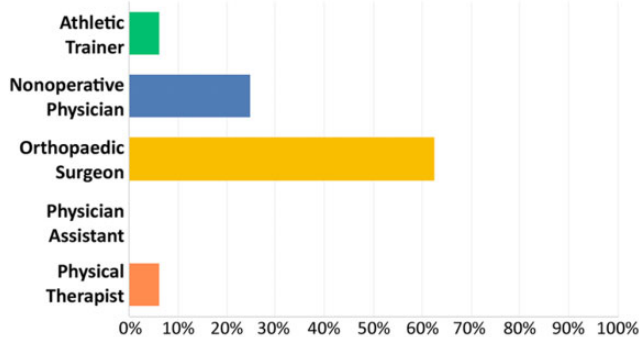


Figure 1. Proportion of survey responses by profession.

5 years of experience, 32% with between 5 and 10 years, and 39% with more than 10 years of experience, and this was reflective of the overall PRiSM membership with respect to the distribution of professional experience. The majority of participants (65.6%) had at least 1 child who had participated in organized youth sports, but only a small percentage (17.7%) reported having a child who sustained a major injury or concussion while playing youth sports that required surgery or ended a season. Likewise, only 17.7% of participants reported having a child who had sustained a concussion while playing youth sports.

American Tackle Football

With regard to willingness to let their child play American tackle football, 60.7% of participants reported that they would not let their child participate in this sport before skeletal maturity. Of those who were against participation before skeletal maturity, 14 of 54 respondents (26%) agreed to participation once skeletal maturity was reached. Therefore, 45% of the survey respondents would not allow participation in this sport regardless of skeletal maturity level (Table 1). The percentage of those agreeing to football participation was essentially equal between those who reported having a history of a child who sustained a major sports injury (10/17, 59%) and those who did not (39/72, 54%).

Concussion

Participants were split on their willingness to allow their child to return to football after sustaining a concussion, even after successfully completing a return-to-play protocol. The majority (56.8%) would allow their child to return to sports after a return-to-play protocol had been performed. Nonsurgeons were more likely to allow return at 76.0% compared with 48.0% of surgeons ($P = .013$). Additionally, survey respondents who reported having a child who sustained a concussion while playing sports ($n = 17$) were more likely to be in favor of their child returning to play football after a concussion than those who had not had this same experience (65.0% vs 33.0%, $P = .026$).

TABLE 1
Percentage of “Yes” Responses to Survey Questions Between Surgeons and Nonsurgeons^a

	Surgeons (n = 61)	Nonsurgeons (n = 35)	P Value
Participate in football before skeletal maturity	36	48	.6516
Participate in football after skeletal maturity	26	25	>.999
ACLR in a prepubescent child	97	80	.0172
ACLR in an adolescent with >2 years of growth remaining	98	80	.0061
RTP after a concussion protocol	48	76	.0129
Single sport before puberty	25	16	.4259
Travel team before high school	61	81	.0955
Opioid medications	71	60	.3453
Patellar stabilization	8.6	10	≥.999
Early shoulder stabilization	41	10	.003
Early drilling of stable knee OCD	52	23	.0127

^aData are presented as percentages. Bolded *P* values indicate statistically significant differences between groups ($P < .05$, Fisher exact test). ACLR, anterior cruciate ligament reconstruction; OCD, osteochondritis dissecans; RTP, return to play.

Sports Specialization

The majority of respondents (77.8%) would not let their child participate in a single sport year-round before puberty. Most (68.9%) responded that they would allow their child to participate on a travel team before high school.

Opioids

Roughly two-thirds (67.1%) of respondents would give their child opioid medication after arthroscopic surgery, but there was a trend toward more years in practice being correlated with less opioid use ($r = 0.9986$, $P = .033$).

Surgery

The majority of respondents were in favor of elective ACL reconstruction (ACLR) surgery for both prepubescent children (90.9%) and adolescents with more than 2 years of growth remaining (92.05%). Conversely, most (90.9%) would not elect to have their child undergo a patellar stabilization surgery after a first-time patellar dislocation with no underlying anatomic abnormalities and no intra-articular loose bodies.

Responses were more mixed with regard to treatment choices for first-time anterior shoulder dislocations and stable knee OCDs. While 69.3% of all respondents indicated that they would not proceed with anterior shoulder stabilization in a skeletally immature child with no glenoid bone

loss, surgeons were significantly more likely than nonsurgeons to pursue surgery. Just under half of surgeons (41.0%) preferred surgery to only 10.0% of nonsurgeons ($P = .003$). Likewise, 57.3% of all respondents were not in favor of drilling a stable knee OCD before 6 months of non-operative management. Again, surgeons were significantly more in favor (52.0%) versus nonsurgeons (23.0%) ($P = .013$).

DISCUSSION

This professional society survey of pediatric sports medicine professionals found that surgeons were more likely than nonsurgeons to elect for early surgical intervention in the treatment of first-time shoulder dislocations (41.0% vs 10.0%, $P = .003$) and stable OCD (52.0% vs 23.0%, $P = .013$) lesions. This supports the first part of our hypothesis, which is that surgeons would demonstrate bias toward early surgical intervention versus nonsurgeons. Conversely, the second part of our hypothesis, which was that respondents who had a history of a child with a major sports injury would be less likely to allow participation in American tackle football or those with a history of having a child who sustained a concussion would be less likely to allow their child to return to play football after a concussion, was rejected by our study findings. Agreement to participation in American tackle football was not different among those who did (59.0%) and those who did not (54.0%) report a history of having a child with a major sports injury. Interestingly, those who reported having a personal history of a child who had sustained a concussion were actually more likely to approve of allowing their child to return to play football after a concussion protocol than those who did not report the same personal history (65.0% vs 33.0%, $P = .026$).

The difference in opinion between surgeons and nonsurgeons regarding early surgical treatment of stable knee OCD lesions underscores the challenges in decision-making associated with the treatment of this condition. It is generally accepted that skeletally immature patients with stable OCD lesions should initially undergo nonoperative management,⁴⁶ with close monitoring over 3 to 6 months. A 50% healing rate has been shown over a 10- to 18-month course of nonoperative treatment.⁸ While patient age and lesion characteristics, such as smaller size, have been shown to be predictors of healing with nonoperative treatment,^{28,47} lack of compliance with activity restrictions and questions regarding the length and type of immobilization make proceeding directly to early surgical treatment worth consideration. In addition, the favorable results and limited invasiveness of in situ drilling of stable OCD lesions are appealing when compared with salvage-type procedures needed for unstable lesions that are unable to be fixed primarily.^{1,3,4,22,25,27,35,49} This rationale has to be weighed against the understanding that if early surgery were the treatment of choice, potentially, at least half of patients would be undergoing unnecessary surgery. While the results of this survey demonstrate that a majority of orthopaedic surgeons are willing to accept a surgical option for

their own child in this scenario, there is a significant difference of opinion when compared with nonsurgeons. This identifies an additional area in which treatment collaboration among health care professionals of different sports medicine disciplines deserves more attention.

Similar to the treatment of knee OCD lesions, first-time traumatic shoulder dislocations in skeletally immature athletes also present challenges in determining the most appropriate management. While it is well-known that skeletally mature patients involved in contact sports are at a high risk of recurrence without surgical stabilization,⁴² much less is known about the potential benefits of early surgical stabilization for the skeletally immature athlete. Their anatomy may provide protection against recurrence, as is demonstrated by the relatively low rate of Bankart lesions in patients younger than 14 years of age with traumatic anterior shoulder dislocations.^{12,41,45} While reported rates of recurrent shoulder dislocation are lower in skeletally immature patients, the reported rates differ widely with small patient numbers and varying study designs.³⁰ The increased likelihood that surgeons would favor surgical treatment after a first-time dislocation is consistent with recent survey results from the Neer Circle of the American Shoulder and Elbow Surgeons,⁴² which demonstrated a consensus toward surgical treatment for patients aged 14 to 30 years after a first-time dislocation. Nonsurgeons may be less aware of the problems caused by increased bone loss with recurrent dislocations and the increased challenges this can create for surgical treatment. Alternatively, nonsurgeon pediatric sports medicine experts may have different experiences and opinions on successfully returning younger athletes to play without surgery. Nonetheless, the results of this survey clearly indicate that there is difference in opinion on this topic between surgeons and nonsurgeons, and this highlights an area for improved knowledge sharing and collaboration.

Surgeons and nonsurgeons also differed in their willingness to allow a child to return to play American tackle football after a concussion (48.0% vs 76.0%, $P = .0129$). There has been an overall increasing awareness and concern regarding return to play after a sports-related concussion.²⁰ Repetitive head trauma can have serious short- and long-term consequences, "including cognitive and attention deficit, headaches, mood disorders, sleep disturbances, and behavioral problems."⁹ Children, in particular, but also adolescent athletes, may have a more prolonged recovery after a concussion. They may also be more susceptible to concussions secondary to their increased head-to-body ratio and their weaker neck muscles.⁹ It was interesting to learn from the survey results that having a personal history of a child who had a concussion did not make a respondent less likely to approve of return to tackle football play after a concussion. The differences in opinion on allowing return to play may have to do with different levels of experience with concussions. Nonsurgeon sports medicine physicians manage concussions as a routine part of their practice, while we speculate that surgeons are much less likely to have a similar level of experience in concussion management. Likewise, parents who have personally experienced a concussion history with their own child have a unique

anecdotal perspective on the effects of a concussion and the ability to safely return to play. These findings illustrate a gap in the understanding of concussion management, particularly with regard to return to contact sports, and support the need for further investigation on this topic.

An additional finding of this survey is that a majority of respondents (60.7%) would restrict the participation of their child from American tackle football before reaching skeletal maturity, while 45% would not allow participation even after reaching skeletal maturity. This is consistent with a recent survey of 227 pediatricians (85% of whom treat concussions), which found that 77% would not allow their son to play tackle football.²⁰ A small percentage (15%) felt tackling should be eliminated completely, and 33% would restrict tackling to 15 years of age and older.²⁰ The majority (81%) supported limiting or eliminating tackling from practice. There was an almost even divide with respect to counseling against youth participation in full-contact sports.²⁰ These sentiments are not new. At a 1953 conference on planning games and sports for young children, the 44 conference attendees recommended against body-contact sports in children younger than 12 years of age.⁶ In addition, a 1957 policy statement by the American Academy of Pediatrics (AAP) on School Health determined that there is no role for body-contact sports in children.⁶ The AAP recently issued a policy statement addressing tackle football through the Council on Sports Medicine and Fitness, which conducted a review of the literature regarding tackle football and reported that eliminating tackling from football would probably reduce the incidence of concussions, severe injuries, catastrophic injuries, and overall injuries.¹³

One topic that received strong consensus among all survey participants was agreement in proceeding with early ACLR for both prepubescent athletes (90.9%) and adolescent athletes with more than 2 years of skeletal growth remaining (92.1%). However, even with the significant overall favorability of early ACLR regardless of skeletal age, there was still a difference between surgeons and nonsurgeons at 97.0% versus 80.0% ($P = .0172$) and 98.0% versus 80.0% ($P = .0061$) for the 2 respective age groups. The consensus agreement for early ACLR in this population is a dramatic swing from the general sentiment expressed as recent as the early 2000s, when the vast majority of orthopaedic surgeons were not in favor of early ACLR in the skeletally immature athlete.²⁶ A survey of the Herodicus Society and ACL Study Group at that time revealed that surgeons were not in favor of early ACLR in prepubescent and adolescent patients, at 84% and 64%, respectively.²⁶ Favorable results associated with physeal respecting reconstruction techniques,^{11,15,24} as well as the knowledge of the increased risks of further chondral damage and meniscal tearing and decreased likelihood of returning to cutting and pivoting sports in patients treated nonsurgically,^{2,14,18,19,29,33,43} may be contributing factors to this dramatic shift in opinion. However, the higher rates of graft failure^{16,17} and risks of potential growth disturbance⁴⁸ remain concerns that must be discussed with young athletes and their families when considering an ACLR. While early reconstruction may protect against or delay the onset of future

osteoarthritis for most patients, it has been proposed by Ekås et al¹⁹ that there are some athletes, particularly those not involved in cutting and pivoting sports, who may be able to cope very well with nonoperative treatment. The Ekås study includes a prospective cohort of pediatric patients with ACL tears in Norway, which utilizes a universal health care system. All respondents to this survey are based in the United States, where early ACLR is readily available and may be a contributing factor to strong consensus favoring early surgery.

Another topic that achieved majority consensus was the support for nonoperative treatment of patients with a first-time patellar dislocation without associated anatomic abnormalities or intra-articular loose bodies. Fewer surgeons (8.6%) were in favor of early surgery compared with nonsurgeons (10%) ($P > .999$). Reported rates of recurrence after nonoperative treatment range in the literature from 30% to 70%.^{10,21,23,31,32,36,38} However, studies looking at early surgery demonstrate mixed results on the ability to reduce the rate of recurrence and fail to demonstrate a clear long-term clinical benefit.^{5,37,38} A recent level 1 randomized controlled trial comparing early direct repair of the medial patellofemoral ligament versus bracing revealed a modest reduction in recurrent dislocation in the surgical repair group, but there was no difference in the overall clinical outcomes between the 2 groups.⁵ The wide variation in treatment approaches with mixed results in the surgical treatment of this condition may be a contributing factor to the collective agreement that nonoperative treatment is the favored initial approach. A recent survey study of the international patellofemoral study group demonstrated a similar consensus.³¹ This is an area where high-quality multicenter randomized studies are needed to improve our understanding of the role of early surgery versus nonoperative treatment.

The consensus was strong that pediatric sports medicine professionals would not encourage their children to specialize in a single sport before skeletal maturity, with 78.0% of all participants against early specialization. While our survey results are unable to determine the reasons why there was a consensus against early sports specialization, recent literature supports this position.^{7,39} A meta-analysis of sports specialization and its related injuries reported a significant level of overuse injury associated with high levels of sports specialization.⁷ Athletes with high specialization were at increased risk of sustaining an injury compared with those with moderate or low levels of specialization.⁷ High specializers were almost twice as likely to sustain an injury compared with low specializers,⁷ and those with a moderate level of specialization were more likely to sustain an injury than those of low specialization,⁷ indicating a stepwise association between specialization and injury risk.⁷ Other concerns associated with early sports specialization include increased burnout and sports dropout, as well as the potential for social isolation.⁴⁰ In addition, there is little evidence that early sports specialization leads to greater athletic achievement.⁴⁰

In response to the increase in youth athlete injury and surgery, both Major League Baseball and USA Baseball recommend not pitching for 3 to 4 months, playing other sports, and avoiding playing baseball for multiple teams at the same time.⁴² While parents may recognize

specialization as a risk factor for injury, this awareness is potentially outweighed by the overwhelming belief that specialization is necessary for optimal development of sports skills, despite a lack of evidence in support of this belief.^{39,40} Post et al⁴⁰ found that 70% to 80% of baseball players' parents believed that specialization would improve their child's baseball performance and chances of making a college team. However, research suggests that early specialization may not result in an increased likelihood of playing professional sports. Of 708 Minor League Baseball players, 64% of them specialized after the age of 16 years, and most sampled many sports before specializing in late adolescence.³⁴ The gap in knowledge regarding the risks versus benefits of early sports specialization among parents and athletes versus pediatric sports medicine professionals and professional sports organizations demonstrates an opportunity for better public education to improve the health and safety of youth sports participation.

A majority of survey participants (69.0%) were in agreement with allowing participation on a travel team before high school. Participating in both club and school teams at the same time is a recognized risk factor for overuse injury,⁴⁰ and yet, this is still a very common practice. Post et al⁴⁰ reported that 71% of children participated in a club sport in addition to their high school team. Post et al⁴⁰ also reported that in a previous study of 1544 high school athletes from various sports, 49% also participated in a club team. Further research is warranted to better understand the impact of club or travel team participation on the health of young athletes. While early sports specialization and participating on multiple teams simultaneously are associated with negative health impacts, as discussed above, it is unclear if isolated participation on an organized club or travel team, as opposed to a recreational league, is an independent risk factor for injury.

Another survey finding was that a majority of respondents (67.0%) were in favor of their child receiving opioid medications after arthroscopic knee surgery. This was a somewhat unexpected finding to us, given that the opioid epidemic in the United States has resulted in pressure on physicians to decrease opioid prescribing by improving patient education and increasing the utilization of alternative perioperative pain-management modalities.⁴⁴ With education and written guidelines, an approximate 50% decrease in opioid prescriptions is possible, while patient satisfaction and pain control remain high.⁴⁴ The survey results did show a trend toward more years of experience being associated with a decreased likelihood of being in favor of opioid use ($r = 0.9986$, $P = .033$), which may indicate that an improved understanding of alternative pain management modalities is associated with more years in practice. However, this study is limited in its scope to determine why respondents were in favor of opioid use after outpatient arthroscopic knee surgery. More research is needed to improve our understanding of how to best manage opioid utilization versus other forms of perioperative pain management after outpatient knee arthroscopy.

The strengths of this study are that it includes responses from professionals among multiple disciplines who treat young athletes and are presumably knowledgeable regarding current pediatric sports medicine research based on their

involvement in PRiSM. However, this study also has many limitations, such as the inherent bias that is implied in the wording of the questions posed in this survey by having participants answer questions based on decisions they would make for their own children or loved ones. While this is an obvious weakness of the study, we believe that this approach elicits more candid responses and provides helpful insight into the nature of these topics. Nonetheless, the survey responses are only able to provide us with insight into how the respondents would act; they do not provide insight into why they would make those decisions. Also, the survey findings represent the opinions of a relatively small number of professionals, with a little over a third of the PRiSM membership represented. While the intention of the study design was to gain perspective from a variety of disciplines, surgeons were overrepresented in the sample. In addition, survey participants may have had differing interpretations of the survey questions. One instance of note is the wording for the question about the treatment of a stable "osteochondral defect." The intent of the question was in regard to the treatment of OCD, which can be referred to interchangeably as "osteochondral defect," "osteochondral lesion," or "OCD," but it is possible that the interpretation of the question may have varied among respondents. This was also a nonvalidated survey, which further limits the reliability of survey question interpretation.

CONCLUSION

These survey findings help us to identify areas where stronger evidence is needed to support the reasoning behind treatment preferences. In addition, they provide information that may be of interest to the general public regarding the health and safety of youth sports. There is a majority opinion against participation in American tackle football before skeletal maturity among sports medicine professionals when asked about their own children. There is strong consensus in favor of early surgical treatment of ACL tears in skeletally immature athletes and for deferring single-sport specialization until after puberty. There are significant differences in opinion between surgeons and nonsurgeons regarding early surgical interventions for the treatment of knee OCDs and shoulder dislocation, as well as whether to allow a child to return to play football after a sports-related concussion. These findings highlight areas where collaborative dialogue and research among different sports medicine professionals are necessary in order to combine the different strengths and knowledge of the various sports medicine disciplines in the pursuit of youth sports safety and injury prevention.

REFERENCES

1. Aglietti P, Buzzi R, Bassi PB, Fioriti M. Arthroscopic drilling in juvenile osteochondritis dissecans of the medial femoral condyle. *Arthroscopy*. 1994;10:286-291.
2. Anderson AF, Anderson CN. Correlation of meniscal and articular cartilage injuries in children and adolescents with timing of anterior cruciate ligament reconstruction. *Am J Sports Med*. 2015;43(2):275-281.
3. Anderson AF, Pagnani MJ. Osteochondritis dissecans of the femoral condyles. Long-term results of excision of the fragment. *Am J Sports Med*. 1997;25(6):830-834.

4. Anderson AF, Richards DB, Pagnani MJ, Hovis WD. Antegrade drilling for osteochondritis dissecans of the knee. *Arthroscopy*. 1997;13:319-324.
5. Askenberger M, Bengtsson Moström E, Ekström W, et al. Operative repair of medial patellofemoral ligament injury versus knee brace in children with an acute first-time traumatic patellar dislocation: a randomized controlled trial. *Am J Sports Med*. 2018;46(10):2328-2340.
6. Bachynski KE. Tolerable risks? Physicians and youth tackle football. *N Engl J Med*. 2016;374(5):405-407.
7. Bell DR, Post EG, Biese K, Bay C, Valovich McLeod T. Sports specialization and risk of overuse injuries: a systemic review with meta-analysis. *Pediatrics*. 2018;142(3):e20180657.
8. Cahill BR. Osteochondritis dissecans of the knee: treatment of juvenile and adult forms. *J Am Acad Orthop Surg*. 1995;3:237-247.
9. Caine D, Purcell L, Maffulli N. The child and adolescent athlete: a review of three potentially serious injuries. *BMC Sports Sci Med Rehabil*. 2014;6:22.
10. Camanho GL, Viegas Ade C, Bitar AC, Demange MK, Hernandez AJ. Conservative versus surgical treatment for repair of the medial patellofemoral ligament in acute dislocations of the patella. *Arthroscopy*. 2009;25(6):620-625.
11. Cordasco FA, Black SR, Price M, et al. Return to sport and re-operation rates in athletes under the age of 20 following primary anterior cruciate ligament reconstruction: risk profile comparing three patient groups predicated upon skeletal age. *Am J Sports Med*. 2019;47(3):628-639.
12. Cordischi K, Li X, Busconi B. Intermediate outcomes after primary traumatic anterior shoulder dislocation in skeletally immature patients aged 10 to 13 years. *Orthopedics*. 2009;32(9). doi:10.3928/01477447-20090728-34
13. Council on Sports Medicine and Fitness. Tackling in youth football. *Pediatrics*. 2015;136(5):e1419-e1430.
14. Crawford EA, Young LJ, Bedi A, Wojtys EM. The effects of delays in diagnosis and surgical reconstruction of ACL tears in skeletally immature individuals on subsequent meniscal and chondral injury. *J Pediatr Orthop*. 2019;39(2):55-58.
15. Cruz AI, Fabricant PD, McGraw M, Rozell JC, Ganley TJ, Wells L. All-epiphyseal ACL reconstruction in children: review of safety and early complications. *J Pediatr Orthop*. 2017;37(3):204-209.
16. Dekker TJ, Godin JA, Dale KM, Garrett WE, Taylor DC, Riboh JC. Return to sport after pediatric anterior cruciate ligament reconstruction and its effect on subsequent anterior cruciate ligament injury. *J Bone Joint Surg Am*. 2017;99(11):897-904.
17. Dekker TJ, Rush JK, Schmitz MR. What's new in pediatric and adolescent anterior cruciate ligament injuries? *J Pediatr Orthop*. 2018;38(3):185-192.
18. Dumont GD, Hogue GD, Padalecki JR, Okoro N, Wilson PL. Meniscal and chondral injuries associated with pediatric anterior cruciate ligament tears: relationship of treatment time and patient-specific factors. *Am J Sports Med*. 2012;40(9):2128-2133.
19. Ekås GR, Moksnes H, Grindem H, Risberg MA, Engebretsen L. Coping with anterior cruciate ligament injury from childhood to maturation: a prospective case series of 44 patients with mean 8 years' follow-up. *Am J Sports Med*. 2019;47(1):22-30.
20. Fishman M, Taranto E, Perlman M, Quinlan K, Benjamin HJ, Friedman Ross L. Attitudes and counseling practices of pediatricians regarding youth sports participation and concussion risks. *J Pediatr*. 2017;184:19-25.
21. Fithian DC, Paxton EW, Stone ML, et al. Epidemiology and natural history of acute patellar dislocation. *Am J Sports Med*. 2004;32(5):1114-1121.
22. Ganley TJF, Amro RR, Gregg JR, et al. Antegrade drilling for osteochondritis dissecans of the knee. Paper presented at: Pediatric Orthopaedic Society of North America 2002 Annual Meeting; May 3-5, 2002; Salt Lake City, UT.
23. Garth WP Jr, Pomphrey M Jr, Merrill K. Functional treatment of patellar dislocation in an athletic population. *Am J Sports Med*. 1996;24(6):785-791.
24. Kocher MS, Heyworth BE, Fabricant PD, Tepolt FA, Micheli LJ. Outcomes of physeal-sparing ACL reconstruction with iliotibial band autograft in skeletally immature prepubescent children. *J Bone Joint Surg Am*. 2018;100(13):1087-1094.
25. Kocher MS, Micheli LJ, Yaniv M, Zurakowski D, Ames A, Adrignolo AA. Functional and radiographic outcome of juvenile osteochondritis dissecans of the knee treated with transarticular arthroscopic drilling. *Am J Sports Med*. 2001;29:562-566.
26. Kocher MS, Saxon HS, Hovis WD, Hawkins RJ. Management and complications of anterior cruciate ligament injuries in skeletally immature patients: survey of the Herodicus Society and the ACL Study Group. *J Pediatr Orthop*. 2002;22(4):452-457.
27. Kocher MS, Tucker R, Ganley TJ, Flynn JM. Management of osteochondritis dissecans of the knee: current concepts review. *Am J Sports Med*. 2006;34(7):1181-1191.
28. Krause M, Hapfelmeier A, Möller M, Amling M, Bohndorf K, Meenen NM. Healing predictors of stable juvenile osteochondritis dissecans knee lesions after 6 and 12 months of nonoperative treatment. *Am J Sports Med*. 2013;41(10):2384-2391.
29. Lawrence JTR, Argawal N, Ganley TJ. Degeneration of the knee joint in skeletally immature patients with a diagnosis of an anterior cruciate ligament tear: is there harm in delay of treatment? *Am J Sports Med*. 2011;39(12):2582-2587.
30. Li X, Ma R, Nielsen NM, Gulotta LV, Dines JS, Owens BD. Management of shoulder instability in the skeletally immature patient. *J Am Acad Orthop Surg*. 2013;21(9):529-537.
31. Liu JN, Steinhaus ME, Kalbian IL, et al. Patellar instability management: a survey of the International Patellofemoral Study Group. *Am J Sports Med*. 2018;46(13):3299-3306.
32. Maenpaa H, Huhtala H, Lehto MU. Recurrence after patellar dislocation: redislocation in 37/75 patients followed for 6-24 years. *Acta Orthop Scand*. 1997;68(5):424-426.
33. McCarroll JR, Rettig AC, Shelbourne KD. Anterior cruciate ligament injuries in the young athlete with open physes. *Am J Sports Med*. 1988;16(1):44-47.
34. Moesch K, Elbe AM, Hauge MTL, Wilkman JM. Late specialization: the key to success in centimeters, grams, or seconds sports. *Scand J Med Sci Sports*. 2011;21:e282-e290.
35. Murray JR, Chitnavis J, Dixon P, et al. Osteochondritis dissecans of the knee; long-term clinical outcome following arthroscopic debridement. *Knee*. 2007;14(2):94-98.
36. Nikku R, Nietosvaara Y, Aalto K, Kallio PE. Operative treatment of primary patellar dislocation does not improve medium-term outcome: a 7-year follow-up report and risk analysis of 127 randomized patients. *Acta Orthop*. 2005;76(5):699-704.
37. Nwachukwu BU, So C, Schairer WW, Green DW, Dodwell ER. Surgical versus conservative management of acute patellar dislocation in children and adolescents: a systematic review. *Knee Surg Sports Traumatol Arthrosc*. 2016;24(3):760-767.
38. Palmu S, Kallio PE, Donell ST, Helenius I, Nietosvaara Y. Acute patellar dislocation in children and adolescents: a randomized clinical trial. *J Bone Joint Surg Am*. 2008;90(3):463-470.
39. Popkin CA, Bayomy AF, Ahmad CS. Early sport specialization. *J Am Acad Orthop Surg*. 2019;27(22):e995-e1000.
40. Post EG, Rosenthal MD, Rauh MJ. Attitudes and beliefs towards sports specialization, college scholarships, and financial investment among high school baseball parents. *Sports*. 2019;7:247.
41. Postacchini F, Gumina S, Cinotti G. Anterior shoulder dislocation in adolescents. *J Shoulder Elbow Surg*. 2000;9(6):470-474.
42. Provencher MT, Midtgaard KS, Owens BD, Tokish JM. Diagnosis and management of traumatic anterior shoulder instability. *J Am Acad Orthop Surg*. 2021;29(2):e51-e61.
43. Ramski DE, Kanj WW, Franklin CC, Baldwin KD, Ganley TJ. Anterior cruciate ligament tears in children and adolescents: a meta-analysis of nonoperative versus operative treatment. *Am J Sports Med*. 2014;42(11):2769-2776.
44. Stepan JG, Lovecchio FC, Premkumar A, et al. Development of an institutional opioid prescriber education program and opioid-prescribing guidelines. *J Bone Joint Surg Am*. 2019;101(1):5-13.
45. Taylor DC, Arciero RA. Pathologic changes associated with shoulder dislocations: arthroscopic and physical examination findings in first-time, traumatic anterior dislocations. *Am J Sports Med*. 1997;25(3):306-311.

46. Van Demark RE. Osteochondritis dissecans with spontaneous healing. *J Bone Joint Surg Am.* 1952;35:143-148.
47. Wall EJ, Vourazeris J, Myer GD, et al. The healing potential of stable juvenile osteochondritis dissecans knee lesions. *J Bone Joint Surg Am.* 2008;90(12):2655-2664. doi:10.2106/JBJS.G.01103
48. Wong SE, Feeley BT, Pandya NK. Complications after pediatric ACL reconstruction: a meta-analysis. *J Pediatr Orthop.* 2019;39(8):e566-e571.
49. Wright RW, McLean M, Matava MJ, et al. Osteochondritis dissecans of the knee: long-term results of excision of the fragment. *Clin Orthop Relat Res.* 2004;424:239-243.

APPENDIX

1. What is your profession?
 - a. Athletic trainer
 - b. Nonoperative physician
 - c. Orthopedic surgeon
 - d. Physician assistant
 - e. Physical therapist
2. How many years have you been in practice?
 - a. Less than 5
 - b. 5 to 10
 - c. Greater than 10
3. Are you a parent of a child who is currently playing or has previously played youth sports?
 - a. Yes
 - b. No
4. Have you ever had a child who sustained a major injury playing sports that required surgery or ended a season?
 - a. Yes
 - b. No
5. Have you ever had a child who sustained a concussion while playing youth sports?
 - a. Yes
 - b. No
6. Would you let your child participate in American tackle football prior to skeletally maturity?
 - a. Yes
 - b. No
7. Would you let your child participate in American tackle football, but only after he or she reaches skeletal maturity?
 - a. Yes
 - b. No
8. Would you let your child return to play a football if he or she sustained a concussion and successfully completed a return to play protocol?
 - a. Yes
 - b. No
9. Would you let your child participate year-round in a single sport before puberty?
 - a. Yes
 - b. No
10. Would you let your child participate on a travel team prior to high school?
 - a. Yes
 - b. No
11. Would you give your child opioid medications following basic arthroscopic knee surgery?
 - a. Yes
 - b. No
12. Would you elect to have an ACL reconstruction performed on your child for an isolated, complete ACL tear if he or she was prepubescent?
 - a. Yes
 - b. No
13. Would you elect to have an ACL reconstruction performed on your child for an isolated, complete ACL tear if he or she was an adolescent with more than 2 years of growth remaining?
 - a. Yes
 - b. No
14. Would you elect to have your child undergo patellar stabilization surgery after a first-time patellar dislocation with no underlying anatomic abnormalities predisposing to further dislocation and no intra-articular loose bodies?
 - a. Yes
 - b. No
15. Would you elect to have your child undergo anterior shoulder stabilization surgery after a first-time traumatic anterior glenohumeral dislocation without glenoid bone loss?
 - a. Yes
 - b. No
16. Would you let your child have an elective arthroscopic drilling of a stable osteochondral defect instead of a prolonged (up to 6 months) period of rest?
 - a. Yes
 - b. No

Figure A1. Survey questions. ACL, anterior cruciate ligament.