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## Adolescent Athletes' Perspectives on the Social Implications of Sport-Related Concussion

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## Adolescent Athletes' Perspectives on the Social Implications of Sport-Related Concussion

### Abstract

**Purpose:** Sport-related concussion can affect many domains of a patient's health status. Social functioning is an important consideration, especially for adolescent athletes. Our purpose was to explore adolescent athletes' social perspectives regarding sport and concussion. **Methods:** Using a qualitative study design we interviewed 12 interscholastic athletes who had sustained a sport-related concussion. The interviews focused on injury details, and explored the physical, psychosocial, emotional, and spiritual components of sport and health. Themes and categories were identified using the consensual qualitative research process by a three-person research team. A comprehensive codebook that captured the main themes and categories resulted. **Results:** Following concussion, participants discussed two primary themes: perceptions regarding the social aspects of sport and social perspectives regarding their concussion. Specific categories related to the social aspects of sport included: friendships and family and decision to participate based on peers. Specific categories regarding the social perspectives of the concussion included uncertainty of the diagnosis, perceptions of others regarding their injury, being ashamed of the concussion, parent and peer roles, and communication and expectation about their concussion. **Conclusions:** Participation in sport and removal from sport following a concussion have significant social implications for adolescent athletes. Specifically, the perceptions of peers, parents/guardians, and others regarding the injury can influence reporting of symptoms and recovery following concussion. Limited communication regarding recovery and expectations post-concussion may cause undue social pressures to return to activity prematurely. Providing a supportive environment in which patients can recover from concussion while engaging with peers and teammates is important. Anticipatory guidance, with education regarding the possible signs and symptoms, risk factors pre- and post-injury, and recovery expectations following a concussion are important to include in post-injury management and should be known to all stakeholders.

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### ABSTRACT

**Purpose:** Sport-related concussion can affect many domains of a patient's health status. Social functioning is an important consideration, especially for adolescent athletes. Our purpose was to explore adolescent athletes' social perspectives regarding sport and concussion. **Methods:** Using a qualitative study design we interviewed 12 interscholastic athletes who had sustained a sport-related concussion. The interviews focused on injury details, and explored the physical, psychosocial, emotional, and spiritual components of sport and health. Themes and categories were identified using the consensual qualitative research process by a three-person research team. A comprehensive codebook that captured the main themes and categories resulted. **Results:** Following concussion, participants discussed two primary themes: perceptions regarding the social aspects of sport and social perspectives regarding their concussion. Specific categories related to the social aspects of sport included: friendships and family and decision to participate based on peers. Specific categories regarding the social perspectives of the concussion included uncertainty of the diagnosis, perceptions of others regarding their injury, being ashamed of the concussion, parent and peer roles, and communication and expectation about their concussion. **Conclusions:** Participation in sport and removal from sport following a concussion have significant social implications for adolescent athletes. Specifically, the perceptions of peers, parents/guardians, and others regarding the injury can influence reporting of symptoms and recovery following concussion. Limited communication regarding recovery and expectations post-concussion may cause undue social pressures to return to activity prematurely. Providing a supportive environment in which patients can recover from concussion while engaging with peers and teammates is important. Anticipatory guidance, with education regarding the possible signs and symptoms, risk factors pre- and post-injury, and recovery expectations following a concussion are important to include in post-injury management and should be known to all stakeholders.

**Keywords:** traumatic brain injury, relationships, social support, athletics

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## INTRODUCTION

Participating in physical activity including recreational and team sports has been shown to be beneficial to health.<sup>1</sup> Specifically, adolescent sport participation improves physical health, cognitive functioning, and enhanced social interactions.<sup>2,3</sup> With a current concern for decreased physical activity and increased screen time use in adolescents, there have been increased efforts to enhance sport participation and increase physical activity.<sup>4</sup> One commonly recommended activity for not only benefitting adolescents' physical health, but also their holistic well-being, is participation in high school sports.<sup>5,6</sup> There are roughly 8 million high school students who participate in sports annually.<sup>7</sup> However, while sport participation has benefits, there is always a risk of injury from participation.

Sport participation injuries can vary in severity type, participation time lost, and how the injury impacts the overall health of the athlete.<sup>8</sup> One such injury that is associated with sport participation is sport-related concussions. It is estimated that each year between 1.1 and 1.9 million sport-related concussions occur in the United States, with a majority of those occurring in the pediatric and adolescent age groups.<sup>9,10</sup> Concussions present with a variety of symptoms, deficits in cognition, and balance impairments that may impact the daily functioning of the patient, in addition to restricting participation in sport. Historically, studies have focused on the acute effects of concussion-related impairments, including symptom presentation, cognition deficits, and balance dysfunction from the time of injury through return-to-play, with only more recent publications focusing on how concussion may impact overall health status, or health-related quality of life (HRQOL).<sup>11-13</sup> The concept of HRQOL is global and takes into account the physical, psychological, and social domains of health, while considering the whole person and addressing disability and societal limitations.<sup>14</sup> The social domain of health revolves around interactions with family, peers and teammates.

Sport-related injuries pose potential strains to the social aspect of an athlete's HRQOL, and the nature of sport-related concussions present a unique set of challenges in this regard.<sup>15,16</sup> Unlike other musculoskeletal injuries with which a patient may have a cast or brace, concussions do not display observable signs. Furthermore, the symptom presentation and prognosis for recovery are individualized and can vary greatly between patients.<sup>17,18</sup> As a result, patients may be out of competition and unable to engage socially with teammates during recovery that may lead to negative influences on the social aspect of an athletes' HRQOL, particularly in the sensitive developmental period of adolescence. This is supported by studies that have identified that athletes experience grief-related symptoms following concussion and throughout recovery, social isolation that can affect school and social activities, and changes in the social dynamics with teammates and coaches.<sup>19-21</sup> There is a need to further explore this area, with a specific focus on understanding the interactions between the social aspects of sport and the perceived social consequences of concussion, which was the purpose of this investigation

## METHODS

### Experimental Design

Prospective data was collected from high schools as part of a larger mixed-methods study investigating the influence of sport-related concussion measures on impairment and HRQOL.<sup>12,16</sup> For this study, a qualitative research design consisting of in-person interviews conducted within the first month post-injury was used. This manuscript focuses solely on patient interviews addressing their experiences following a sport-related concussion, with a specific focus on the social aspects of the injury.

### Participants

Participants included 12 interscholastic athletes (4 females, 8 males; age=15.7±1.7 years; grade level=10.2±1.4; sports=football, soccer, volleyball, basketball, and wrestling) from metropolitan areas. Criterion sampling was used to recruit potential participants. Inclusion criteria were sustaining a sport-related concussion during interscholastic activity and being held out of sport participation for at least 10 days. To maintain anonymity, each participant was given a pseudonym (Table 1). This study was approved by the University Institutional Review Board. Verbal and written parental permission and verbal and written patient assent were obtained before the interview. Each interview was recorded following the permission and assent process.

**Table 1. Participant Demographics**

Participant Pseudonym	Sex	Age	Grade	Primary Sport
Jane	Female	13	8	Soccer
Julie	Female	14	9	Soccer
Sarah	Female	16	10	Soccer
Susie	Female	18	12	Basketball
Andrew	Male	15	9	Basketball
Benjamin	Male	16	11	Football
Cody	Male	16	11	Football

Charlie	Male	14	9	Football
Greg	Male	15	10	Football
John	Male	15	10	Football
Paul	Male	18	12	Football
Robert	Male	18	12	Wrestling

### Instrumentation

The qualitative interview protocol was intended to assess all aspects of the disablement model and used the Short Form-36 outcomes measure and the International Classification of Functioning Disability and Health (ICF) model as a general framework.<sup>22,23,24</sup> The ICF framework allows the study of health status, outcomes, and contributing determinants, establishes a common language among various groups, and provides a holistic view of the injury or illness.<sup>24,25</sup> The interview protocol aimed to address all aspects of HRQOL, including social, emotional, and mental health through a series of approximately 50 questions. The general topic areas covered in the interview included personal and sport demographics (12 questions), injury history (3 questions), physical functioning (6 questions), mental health functioning (5 questions), accomplishment and support seeking (2 questions), social status/role transitioning (3 questions), relationships (8 questions), spirituality (4 questions), and expectancies (5 questions). Prior to data collection, pilot testing was completed with healthy adolescents to assess for question clarity, participant understanding, and administration timing.

### Procedures

Participants were recruited from 15 high schools. If the patient had remained out of sport participation for at least 10 days following the concussion, the school's athletic trainer notified the research team. The parent and student-athlete were contacted by the research team to participate in the qualitative study, at which time parental consent and athlete assent were obtained. Two researchers who had post-graduate academic training and experience in qualitative interviews were involved in conducting the interviews with the participants. The interviews were conducted to assess the meaning given to participants' sport-related concussion and how they perceived it affected their health status. The interviews were conducted at a location of comfort to the participant and were audibly recorded. On average, the interviews lasted 45 minutes. After the interview was completed, the recordings were professionally transcribed.

### Data Analysis

Data analysis was conducted by 3 researchers previously trained in the consensual qualitative research (CQR) data analysis process.<sup>26,27</sup> The CQR approach focuses on using multiple researchers coming to a consensus while constantly and repetitively analyzing the cases until there is a conclusive and complete understanding of the findings.<sup>26,27</sup> Data trustworthiness was ensured through the inherent nature of the consensus process and use of multiple analysts of CQR to minimize researcher bias.

We followed the 4 progressive stage CQR analysis process as detailed by Hill et al.<sup>26</sup> These stages include: (1) developing initial code domains, (2) separating key ideas from each domain, (3) cross-analyzing multiple interviews via development of categories and themes, and (4) identify the frequency of participants per category.<sup>26,27</sup> To begin, the research team coded three initial transcripts individually to identify initial code domains. They then met to discuss the code domains and develop a consensus codebook. All transcripts were then coded into the proper domains based on the consensus codebook. Once the data were placed into the domains, the research team separated the core ideas from each domain so that the statements made by the participants could be concisely summarized.<sup>27</sup> Finally, multiple interviews were cross-analyzed to examine relationships, similarities, and differences. After cross-analysis was completed, the frequency occurrence for all categories was recorded to determine the occurrence of each category across the whole sample, thus allowing for the entire sample to be represented.<sup>27</sup> Frequency categories are divided into 4 different components: (1) general, (2) typical, (3) variant, and (4) rare. For this study, a category was considered general if it applied to all or all but one case, typical if it applied to more than half of the cases, variant if it applied to less than half of the cases, and rare if it applied to only 2 to 3 cases.<sup>27</sup>

### RESULTS

Four main themes emerged during the data analysis, which included 1) perceptions of social aspects of sport, 2) social perspectives of a sport-related concussion, 3) psychosocial experiences following a sport-related concussion, and 4) single-item HRQOL responses.<sup>16</sup> However, for this manuscript, we solely focused on the perceptions of the social aspects of sport and the social perspectives of a sport-related concussion themes and their associated categories. Frequency counts for each theme are provided in Table 2, following the frequency categorization conventions of Hill et al. (2005).

**Table 2.** Participant cases by theme and category.

Theme	Category	Frequency	Number of Participant Cases
Perceptions Regarding the Social Aspect of Sport	Family and Friendships	General	11
Perceptions Regarding the Social Aspect of Sport	Decision to Participate	Variant	6
Social Perspectives of the Concussion	Uncertainty of Diagnosis	Typical	10
Social Perspectives of the Concussion	Ashamed of the Concussion	Variant	4
Social Perspectives of the Concussion	Perception of Others	General	12
Social Perspectives of the Concussion	Parent/Guardian and Peer Roles	General	11
Social Perspectives of the Concussion	Communication and Expectation	General	12

**Theme 1: Perceptions Regarding Social Aspects of Sport**

Two categories emerged during analysis related to perceptions regarding the importance of the social aspect of sport: *Family and Friendships*, and the *Decisions to Participate Based on Peers*.

**Family and Friendships**

Participants discussed their desire to participate in sport due to a family history of participation in that sport or other sports or because it was an activity in which many of their close friends also participated. Greg highlighted his family's closeness to sports,

"Sports, that's basically life, because we don't do much besides sports, like ESPN is almost always on, our rooms are all decorated in sports, we have a batting cage. Our back yard has a huge field to play sports in so whenever we have time, it's sports"

Jane mentioned her mother's athleticism as a reason,

"Yeah, my mom actually played soccer as well up until college and I think it's just genetics too, and it just rubbed off on me. Like you know how sometimes parents, like whatever they do their kids start to do. That's how it was with me. My Mom played soccer and then I played soccer."

Benjamin described his parent's push to include sports within his social network,

"Um, well early on, early in my childhood when I was younger, I didn't really have that much interest in sports and stuff like that and they didn't take it like as a concern, but they were kind of worried like oh, we were all interested in sports, is there anything wrong with him. But, when I started getting into football and I played baseball a little bit and basketball, I kind of touched every sport here and there. They started thinking okay; this is going to be good, like get friends and stuff like that. So, I would say yes, they have seen it as a good success for like friends and school and stuff."

While Jane described the role of friends,

"Usually on Fridays and then Saturdays I hang out with my soccer friends because usually every weekend we have either a game or a tournament. So, then we just hang out until our next game together. So basically, my soccer friends are like one of my closest friends I mainly hang out with them every weekend."

Paul further described his teammates as friends,

"I have a relationship with each player, like we joke around and have fun. But when it comes down to it, we're a team and we're a family and we're supposed to like each other but sometimes you get to that point where you don't like that person but yeah, it's a big role as captain."

Furthermore, many described participating in sports starting from a young age and how it has become an important aspect of their lives. Charlie mentioned,

“Um, well, I had four brothers growing up, and the always played baseball, so they would take me out and play catch, or whatever, when I was really young and then I think I started playing T-Ball when I was 3 or 4.”

Robert noted,

“Well, I mean it's just fun. It's nice, I've been playing [sports] since before I can remember. My Dad has put me in sports since I could walk. It's just always been something I've done.”

Finally, Greg noted,

“It was, well my Dad showed [the sport] to me and I just liked it ever since. My first word was ball.”

### **Decisions to Participate Based on Peers**

Participants highlighted that their decision to participate in sport was often based on peers and to interact with friends. Benjamin noted,

“I got started with one of my friends, we played football once and I was just a tag-a-long. And I guess I did really good and one of my friends recommended that I play football. And I just kind of continued on.”

Andrew commented,

“One of my friends in our neighborhood asked me to play for their team. So I started there and I was pretty good and I had natural talent and the coaches at school started working with me and then I was starting, towards the second half of the season.”

Charlie mentioned,

“Because all my friends were playing. And talking about it and I just got excited and wanted to play again.”

Lastly, Susie suggested,

“Like I know in volleyball, there was like 8 of us seniors on one team and there was some drama but overall it was like a lot of fun. And like I think that's half the reason why I do sports is because I enjoy just the hang out. “

## **Theme 2: Social Perspectives of Concussion**

Five categories emerged during analysis of social perspectives regarding concussion: *Misunderstanding of the Diagnosis, Being Ashamed of the Concussion, Perceptions of Others Regarding the Injury, Parent/Guardian and Peer Roles, Communication and Expectation about the Concussion.*

### **Misunderstanding of the Diagnosis**

Participants often expressed a delay in diagnosis, mainly due to uncertainty of whether a concussion occurred. Benjamin describes,

“No. I didn't say anything to anyone because I thought, no it was just hot, first day of [football] I'm probably just dehydrated, like no big deal. But ironically, the next day, they were doing concussion tests for a few of the athletes, for different teams and just a few of the football players went and I was one of them. I was reading over the symptoms and I was like, wow I kind of have a few of these rights now. So I went to talk to [the athletic trainer] during the test and I was like, I'm having a few of these symptoms like right now.”

Greg noted,

“But I was kind of like woozy, but I didn't know it was because of a concussion. But then, that Tuesday, it just turned into a really bad migraine and then I talked to the athletic trainer about it and he told me to go see my doctor and my doctor said it was a concussion.”

Charlie reiterated that it did not seem that bad,



"I just got hit and I got back up, thinking it was no big deal, you know, just a tackle that hurt. So, I got up and kept doing it over and over again."

Susie noted,

"Well for a while I didn't even know if it was a concussion. I was just like I keep having headaches all the time and then I finally went to a doctor and they're like yeah it's probably a concussion. I guess because I didn't even know that I really had a concussion I think until like he doctor confirmed it and said that you definitely have a concussion, I don't know it's kind of been anticlimactic, but whereas if you like tore your ACL I think you, I think I'd feel it a lot more, and also because it's been totally indefinite that when I get back, like as soon as I got it, it was like okay we just want you to stay off work for like a week and you know miss one game and that's bad but it's not like the end of the world, and then um, well I'm not in the game, but..."

Lastly, Jack commented,

"I just thought I'd got hit really hard, you know. I got hit last year like that but I'd never had all these symptoms and headaches and all that. I just got hit that night, went to bed, took some Tylenol. I kind of made me feel better and then the next day before practice, I was fine."

### ***Being Ashamed of the Concussion***

Several participants felt ashamed of the concussion and the resulting removal from participation in activities, such as school and sport. In particular, Benjamin described,

"I just think it's really bothersome how I don't know, like my parents don't really believe me. I don't know if they think I'm faking all this. I don't know like what they think of me right now. It's just kind of like, well my parents don't really believe me. It's just kind of like that weird feeling like my parents, are they disappointed in me? Or like what do they think of me right now? I don't know it's just a weird feeling."

And Jane noted,

"Actually, [the physician] told my mom... she actually made a good point that if a kid came to school with a cast or something, they'd get a lot more sympathy towards them than a kid with a concussion. I thought that was a pretty good point because it's so true. A broken bone, a broken leg will get more sympathy than a Grade III concussion would. I don't think it's that fair because a broken leg will heal but you know a concussion probably won't."

Susie suggested,

"I think is kind of good though because I didn't want like I don't know I didn't want people to be like [Athlete] has a concussion. Because well I don't like when I'm viewed differently just because I'm like in a, because I'm injured or whatever I don't think, I don't really know why, but I just, I didn't like tell my teachers or anything."

Jack even described how he still attended practice,

"Oh, yeah I continued to go to practice you know I've got to support my team you know. I don't want them to feel like oh, I got injured, I don't need to be here."

### ***Perceptions of Others Regarding the Injury***

Many participants expressed concerns on how others perceived their injury, especially with family or friends downplaying the severity of the concussion or need to remain out of school or sports. Cody noted,

"Because I had this thing like I hate getting all the crap that people give to you, they think you're faking it and stuff like that."

Similarly, Greg commented,



"Because they think it's, honestly I probably don't know why but probably just like oh it's a concussion. But some of my friends think that, I don't know why they think this, but they think I'm faking it."

Greg also noted concerning comments from coaches,

"They like ask me how my symptoms have been and I've told them. And they're like you've got to be kidding me, it's still lasting this long."

Jane also mentioned,

"Other times, like okay like [my family member] says, you use your concussion for an excuse for everything. Then I got pretty upset because of that. Because that's so not true and I got pretty upset at her for that but that was probably the only time when I got really upset at home."

In contrast, other participants reflected on the support they received from family and teammates. Sarah described,

"How much the people around me care. And how much they worry about me."

Benjamin noted some understanding from teammates,

"I think since they do the concussion tests and stuff like that too, I think they have a general understanding like I do on how serious these concussions can be. So, I think they see this more as like you know, like [Athlete's] out like he's got some situation, you know like nothing like teasing or anything like that. They're still just as great of friends as they were before. I think they just kind of understand that it's kind of serious and that I'm just sitting out and making sure that this is alright before I go on the field. I think they do understand that."

### ***Parent/Guardian and Peer Roles***

Participants were divided on the roles assumed by parents and peers and the understanding of and empathy towards the concussion. Some felt that their parents were very understanding and helpful, while others noted conflicts with parents as a result of the concussion. Jane mentioned the helpfulness of her mother and teachers,

"My mom, like she's made a huge difference. Probably without her I still would have been how I was the week after my concussion. Well, probably not that way but I mean, like I wouldn't have been as well. I probably wouldn't have made such big improvements as I have from a month ago to now without her. Just having like my teachers being understanding, because that really helped. Because I thought my grades would really going to suffer because of this because I've been missing so much school lately and I was stressed out about like having my grades, like having a C or something on my report grade and I was pretty stressed about that. I think my mom and my teachers have made a difference in this because they put a lot of stuff off of me. I wouldn't have as much I mean I would have more stress if they didn't help me out as much as they have."

Benjamin noted frustration on the part of his parents,

"Well, they're frustrated at me with not being able to be on the field and that stuff. But, to be honest I don't think they really understand. I don't think they realize that after all these concussions like, I could be in trouble here but it's like they don't really realize that. They think I should be better and should be back on the field. That's what they are putting out to me, that's what they seem like. They don't seem like; oh this is a concern, like you need to stay out. they're kind of more like, well you need to get back into the game, like. You have been out already for a month. I don't think they really understand how I feel, I don't think they really understand like how bad concussions can get, if I kept getting them."

Julie noted conflict between her parents with respect to their roles,

"Um, I think my mom is a little more understanding than my dad. My dad thinks oh, she should be going to school, why is she skipping so much. My mom kind of knows because she sees me more. My dad works more. My mom is a stay-at-home mom. My dad works all the time except for weekends, he doesn't. But she lets me stay home from school if I wake up with headaches, sometimes, usually I don't but if I do wake up with headaches she lets me skip like the beginning

of school and then if like I'm feeling better later on, then I go back to school for like the last few periods because I have to come back here anyways because I usually have an evaluation that's why."

Charlie noted how his parents helped facilitate meetings with school personnel,

"My parents were upset that I wasn't doing, like as good as I should be in school and know I should be better. So, they called my counselors, and they scheduled a meeting with my teachers and [my athletic trainer]. And, um, they just talked about trying to cope with me and made sure everything is right and then contact my parents."

Participants also noted different responses from peers regarding their role in the concussion process. Jane noted,

"Like I would just get so upset over small things and I still kind of do, because there are some kids at my school that are just, it's just annoying because they don't understand like how severe a concussion really is. Because I didn't understand either, I'll admit. I didn't understand how severe concussion is before now but they just like, oh, do you remember me and you probably don't remember because of your concussion, right? And it's just so stupid. But, kids at school are just stupid like that."

Benjamin noted how a friend who had also sustained a concussion was helpful,

"One of my actually good friends had a concussion between the time where I had my first one of this year and then the last one that was about a month ago. He had one and I would actually just talk to him like, what kind of symptoms do you have? Or, he'd be like oh, I had real bad visual problems, headaches and I'd be like oh, I have those too and just kind of like talk about like you know, different symptoms and he felt differently. But um, I think 2 or 3 maybe other guys have gotten a concussion. You know, I've been aware of you know, like oh, I've got a concussion but probably it was more of my friend that I actually talked about him but you know with like another player on the varsity when he got a concussion, I was just more like, oh hey, how are you feeling? Like feeling better? Like oh, when are you going to come back, like oh that's cool, that kind of stuff. Not really talking about any symptoms or anything. That was just more my friend."

As did Andrew, who was recovering from his concussion at the same time as a teammate,

"Yeah, well he's somebody I can talk to about it. Like almost every day, he'll text me and I'll text him and say, like hey, how are you feeling? Or, we're going to be on the news tomorrow together, so that was cool for us to be able to do that together. And, we're both like the team managers of the baseball team, so we both go to the games and sit there. I just relate to him more. It's just, we were on the same baseball team last year together so I knew him, and had a class with him last year, so we were buddies. But, he wasn't really somebody that I hung out with on a regular basis but now it's turning into that. Um, having somebody to vent to, or relate to so I don't feel so bad. Because I felt when I was okay, I felt really bad for him because I saw him standing on the sidelines, not being able to do anything he wanted because he felt bad. I can just talk to him or hang out with him, because we'll just like hang out."

Sarah mentioned similar support when describing her teammates,

"They call you know, they're all worried about me and stuff and I don't like being worried about like all this stuff. I've thought about it a lot, I just don't like people worrying about me. So, they come kind of want me to be safe and also say I only have one brain and so, you know, they'd rather me be healthy than to keep playing soccer."

### ***Communication and Expectation about the Concussion***

Lastly, concerns were expressed regarding the type of communication received and the expectations provided by medical personnel in regards to recovery from the concussion, sport-related activities, and activities of daily living. Specifically, many participants noted it would have been helpful to have a better understanding of the recovery process and timeline. Jane noted,

"Well, it probably wouldn't have made it any different but it probably would have made me a little bit more prepared because if somebody had told me that I wouldn't be able to do any physical activity, like any playing of sports or anything for a long time, because I think that would have helped me. I probably would have been a little upset in the beginning but then I probably would have gotten used to it later on. But now, that's all I can think about. Not really all I can think about but mainly what I think about, is like when am I going to get back to playing soccer."

Similarly, Greg noted,

“Um, that probably it would last this long, all the headaches and stuff. Because when I first got it, I thought it was just going to be like the last one, a couple of weeks and I’ll be fine. But, especially that the symptoms have been lasting this long.”

Others felt communication, especially to school personnel, was handled appropriately and was helpful to their recovery. Jane highlighted,

“Yeah. My mom emailed them. I have four teachers because its middle school, like you know, each teacher for each subject, one teacher for each subject. They’ve been really understanding and stuff. But, they’re just really awesome, they’ve been pretty awesome for the whole past week because of my concussion. I don’t know, I couldn’t ask for better teachers because they’re really understanding.”

Similarly, Julie noted,

“So the trainer at our school, she sent an email to all my teachers saying I might need extra time on things and that I’ve been out and she explained to them like the facts of like my concussion and stuff like that. So they are like more understanding now about my absence stuff.”

Jack mentioned,

“Yeah, I already talked to my counselor you know. She said if you need help with something, or if you don’t remember or anything go talk to your teachers. No matter what, they’ll be there for you.”

## DISCUSSION

The current study aimed to evaluate patient experiences following a sport-related concussion and outline social implications following injury. Participation in sport is often associated with positive social interactions and a desire to engage with friends and teammates, thus removal from sport following a concussion can have significant social implications for adolescent athletes. Specifically, the perceptions of peers, parents, and others regarding the injury can influence reporting of symptoms and recovery following concussion.<sup>16</sup> These perceptions may result in additional psychosocial stress including depression, mood disturbance, and anxiety.<sup>28</sup>

As with any injury, it is important to understand the patient’s experience beyond their physical deficits, but also to examine the multi-dimensional impact of their injury on their psychosocial well-being and global HRQOL.<sup>12,29</sup> The results of this study provided in-depth testimony of adolescent athletes in this regard, illustrating that sport-related concussions present several unique challenges to an adolescent’s social experience through sport.

### Social Importance of Sport

Previous research has shown the importance of youth sport participation in providing a template for youth athletes and their families to strengthen their familial relationships, develop peer friendships, and positively engage with their communities. Participants in this study detailed their desire to capitalize on this positive social potential, which often drove their decision to participate in youth sports throughout their development. It is clear from our findings that sport plays an important role in the lives of these individuals and involvement in sport is a significant aspect of their social identity. Though shared sport experiences had historically facilitated social enjoyment among this sample, the disruption to social normalcy caused by suffering a sport-related concussion appeared to exacerbate these athletes’ degree of psychosocial distress. Previous literature has shown this experience to be common among injured athletes, though the emerging themes of this study illustrate the importance of tailoring psychosocial treatment to the unique characteristics of adolescent athletes who suffer a sport-related concussion.<sup>30</sup>

### Social Perceptions of Concussion

#### *Misunderstanding of Diagnosis*

Compared to other injuries in which symptoms are more uniform and visibly apparent, sport-related concussions are more variable in their sequelae while the timeline for recovery is more ambiguous.<sup>31</sup> These relatively less tangible characteristics of sport-related concussions not only impact the athlete’s experience with their injury but are also impactful in their social interactions. As participants navigated these challenges post-concussion, they explained how their uncertain diagnosis caused them to question

the degree to which they should continue their sport participation, in turn casting doubt on their social role. Facilitating patient's perceptions of being knowledgeable of their injury has been shown to aid in psychosocial well-being;<sup>32</sup> for adolescents with sport-related concussion, proactive education of athletes and stakeholders about symptoms, prevalence, and prognosis of concussions may help them to be more effective and comfortable in recognizing and reporting their symptoms. This would not only lessen the risks of negative physical consequences stemming from failing to report or remove the athletes from competition, but also lessen the psychosocial strain they experience throughout the diagnostic and recovery process.

#### *Being Ashamed of the Concussion*

Another emerging theme that is important to purposefully address was the feeling of shame several athletes reported feeling due to their removal from competition. Research has indicated that a patient's comfort in seeking social support is a key factor in the successful maintenance of their post-injury well-being.<sup>33</sup> In cases in which the athlete feels ashamed about sustaining a concussion, it is logical that this would stem into their propensity to accurately report their symptoms, be patient with their recovery timeline, and seek social support.<sup>34</sup> Other studies have identified similar themes due to the invisibility of the injury and feeling the need to minimize concussion symptoms.<sup>16,19,20</sup> Thus, it is important to not only educate athletes, but also associated stakeholders to ensure that the severity, prevalence, and potential consequences of sport-related concussions are well-understood to destigmatize any inappropriate negative perceptions of the athlete's injury and promote implicit social support.

Another psychological construct that is relevant in discussing the shame felt by participants in this study is that of "athletic identity."<sup>35</sup> This refers to the strong sense of self, pride, and belonging tied to athletic status and sport participation.<sup>36</sup> Previous research has shown that a stronger sense of athletic identity is linked to a higher degree of psychosocial disruption after suffering an injury.<sup>37</sup> Thus, the athletes in this sample who described feeling ashamed may be feeling a lesser sense of their normal "self," which negatively impacted their affective and cognitive response to their injury. Recommendations for mitigating the risk of disrupted athletic identity include maintaining involvement in team activities, and a proactive effort to acknowledge this identity struggle while helping the athlete find fulfillment in other enjoyable activities may help to stabilize their psychosocial well-being.<sup>32</sup>

#### *Perceptions of Others Regarding the Injury*

As adolescent athletes navigate the internal psychosocial rigors associated with sustaining a sport-related concussion, the external impact of their surrounding social environment also plays a key role.<sup>38</sup> Any sport-related injury changes the nature of social interactions among teammates, coaches, and supporting stakeholders, but the participants in this study indicated that the "invisible" nature of this injury cast doubt onto the nature of how others perceived their injury.<sup>39</sup> While supporting stakeholders should make their recognition of this injury clear, other qualitative work has found that a superfluous amount of social support (i.e., being overly-sympathetic) may lead to the athlete doubting the fullness of their recovery and ability to return to sport.<sup>40</sup> Furthermore, conflict over social support has been identified, with differing views on the part of the patient and coach and teammate as to whether enough support had been provided.<sup>21</sup> Establishing clear channels of communication, providing empathy, but also striving to promote confidence in athletes as they recover and approach clearance for return to play can help athletes to feel more secure in the perceptions of their surrounding social system.

#### *Parent/Guardian and Peer Roles*

Two critical roles in these athletes' support systems are parents/guardians and peers, and athletes become even more dependent on these stakeholders for support post-injury.<sup>41,42</sup> While athletic trainers, coaches, and teammates may keep their social interactions somewhat contained to sport settings, the day-to-day influence of parent/guardians and peers permeate multiple facets of a recovering athlete's HRQOL. Participants expressed their parents/guardians and peers possessing misconceptions about the nature of this injury, both in underestimating and exaggerating the nature of their symptoms. These conflicts with parents/guardians and peers may also increase anxiety about the injury, as these stakeholders are often the primary reason for sport participation in the first place, as described in our first theme. Determining an appropriate level and type of support that each group should provide to the patient is likely an individual decision; however, understanding that patients need some level of support is critical to foster a positive environment.<sup>21</sup> Once again, proactive efforts to educate parents and peers about the multi-dimensional impacts of sport-related concussions can help in identifying symptoms, communicating with non-sport related stakeholders in school settings (e.g., school nurses, teachers), and focusing strategies on specific support roles may enhance the ability of parents and peers to positively contribute to the recovering athlete's psychosocial well-being.<sup>42</sup>

#### *Communication and Expectations about the Concussion*

Finally, patients reported that the quality of communication, particularly in terms of expectations for their recovery experience, were impactful on their psychosocial well-being throughout recovery. It has been noted that athletes often experience elements of grief following a concussion, as the concussion results in disruptions in their life, social isolation, and loss of athletic identity.<sup>19</sup> This theme aligns with previous research which has identified that feeling informed, knowledgeable, and self-determined in recovery

enhances a patient's affective experience, regardless of their injury.<sup>40</sup> It is again important to note the characteristics of sport-related concussions that differ from previous sport-related injury research: While the latter category (e.g., knee or shoulder injuries) tend to have more standardized timelines that may help in informing the patient and shaping expectations, the sequelae associated with sport-related concussions are less standardized.<sup>38</sup> Thus, efforts can be made to individualize communication to the patient's areas of disruption, while also attempting to offer anticipatory guidance and education regarding possible signs and symptoms, pre- and post-injury risk factors, and recovery expectations.<sup>42</sup>

### Limitations and Future Directions

Our study is not without limitations. We recruited participants from 15 schools in one geographic area who had been held out of sports participation for at least 10 days, sampling from those with persisting symptoms. These findings may not generalize to individuals who have a relatively uncomplicated recovery from their concussion or individuals from other racial and ethnic groups. Furthermore, we did not have access to the participants' medical histories to determine whether pre-existing underlying issues related to emotional or psychosocial health were present. However, participants described their experiences following concussion in relation to their perceived pre-concussion health status.

Future studies should aim to evaluate the impact of concussion on other areas of HRQOL and provide recommendations for clinicians in administering and interpreting patient-oriented outcomes to assess these important domains. Additionally, developing our understanding of how personal or contextual factors may influence the disruption and severity of areas of adolescent athletes' social experiences after a sport-related concussion may allow treatment and practical strategies to be increasingly effective.

### CONCLUSION

Participation in sport and removal from sport following a concussion have significant social implications for adolescent athletes. Specifically, the desire to participate in sports is often to engage with family and peers. The perceptions of peers, parents/guardians, and others regarding the injury can influence reporting of symptoms and recovery following concussion. Removal from participation and being asked to limit school and social activities can cause an athlete to lose their athletic identity. Limited communication regarding recovery and expectations post-concussion may cause undue social pressures to return to activity prematurely. Anticipatory guidance and adequate social support, with education regarding the possible signs and symptoms, risk factors pre- and post-injury, and recovery expectations following a concussion are important to include in post-injury management.

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