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Stakeholder-Engaged Development of a Theory-Driven, Feasible, and Acceptable Approach to Concussion Education

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Abstract

Concussion education is widely mandated and largely ineffective. Recent consensus guidance on concussion education asserts the importance of (1) theory-driven programming that targets the team as a system and (2) working with end users throughout the development process, and considering issues such as feasibility, acceptability, and sustainability. Consistent with this guidance, and in collaboration with youth sport stakeholders in two regions of the United States, we developed a novel approach to concussion education: Pre-game safety huddles. Safety huddles have the following two core components: (1) athletes, coaches, and other stakeholders come together before the start of each game and (2) opinion leaders (coaches, referees) affirm the importance of care seeking for suspected concussion. The aim of this article is to provide an overview of the collaborative process through which we refined the safety huddle concept into an acceptable and feasible intervention with potential for sustainable implementation in diverse youth sports settings with minimal resource demands. In describing our process and discussing challenges and opportunities, we hope to provide an example for others seeking to develop and implement injury prevention interventions in youth sports settings.

Keywords

adolescents; population groups; health education; general terms; injury prevention/safety; sports

Currently, nearly all organizations that administer youth contact and collision sport in the United States require some form of concussion education for athletes. However, existing approaches have been largely ineffective in changing concussion care seeking behavior

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(Caron et al., 2015; Conaghan et al., 2021). Key reasons have been outlined previously (Kroshus & Chrisman, 2019):

1. Education assumes decisions about symptom reporting are made rationally, despite evidence suggesting they are often emotional and reactive on the field of play.
2. Education tends to occur at an individual level rather than a systems level, despite substantial literature suggesting that interpersonal and group processes are key drivers of concussion reporting behavior.
3. Education is most often delivered once, despite the importance of repetition for retention and salience.
4. Development of educational programming rarely engages diverse stakeholders or considers implementation challenges in a variety of settings.

To address these issues, we developed a novel approach to concussion education: Pre-game safety huddles (Kroshus & Chrisman, 2019). We created and refined safety huddles in collaboration with community organizations serving youth athletes, feeling strongly that this was the best way to ensure the intervention would meet the needs of all stakeholders and fit within the organizations' structures, resources, and priorities. Such an approach follows the recommendations of recent consensus guidance on concussion education, which asserts the importance of addressing implementation considerations such as sustainability and scalability during program development, and working closely with diverse stakeholders throughout this process (Kroshus et al., 2020). Critically, such work is rarely undertaken or documented for concussion education programs or in the sports medicine literature more broadly. Stakeholder engagement has been broadly classified into the following three categories: (1) non-participation, (2) symbolic participation, and (3) engaged participation (Goodman & Sanders Thompson, 2017). Collaboration, a form of engaged participation, includes both researcher and community member involvement in program design and implementation, with all benefiting from the partnership (Goodman & Sanders Thompson, 2017). The aim of this article is to provide an overview of the collaborative process through which we refined the safety huddle concept into an acceptable, feasible, and readily scalable concussion education intervention. In describing our process and discussing challenges and opportunities, we hope to provide a model for others to work collaboratively with stakeholders in the youth sports setting in program and implementation strategy development.

Collaborative Concept

The huddle concept grew out of a conversation between our research team and two local football league coach administrators, one of whom proposed having coaches share brief safety-supportive messaging before football games. We agreed that this direction made sense for concussion education—simple, low-tech, and aligned with the culture of sport, which already used huddles to reinforce important messaging. It was also consistent with extant research about social norms theory and concussion reporting behavior (Kroshus et al., 2015) and we were drawn to the similarities between this idea and the safety huddles used prior to

a surgical procedure (Franklin et al., 2020). In both settings, the goal of the huddles was the same: to create a pause before an event with an element of risk, and to allow leaders (e.g., referees, coaches, and administrators) to reinforce the importance of safety. Our research team submitted a funding proposal to the Centers for Disease Control and Prevention to fund further development and testing of this concept. While we awaited word of funding, the youth football coach administrators who helped generate the huddle concept chose to implement safety huddles in their league the next season. They developed messaging for coaches to share prior to each game and attached key talking points to coach clipboards. They also added a post-game huddle, having coaches from both teams decide which players had demonstrated the most sportsmanship in the game. We were awarded funding in the fall of 2017, and as we finalized research procedures, we observed our colleagues' safety huddles, taking careful notes about what worked well and what needed refinement. We watched two teams of youth football players line up and remove their helmets. We listened as coaches talked about teamwork and respect. At the end of the season, we met with coaches and league administrators to learn about their experiences with huddles and how they might be improved. Their feedback helped us design a preliminary script for huddle leaders.

Collaborative Development

In the spring of 2018, we engaged in an iterative process of refining the huddle concept and developing an implementation strategy in partnership with youth soccer teams in Western Washington and rural southern Georgia. During this time period, safety huddles were trialed at 167 games. Study staff attended games, systematically recorded details about the huddles, including logistics, duration, content, stakeholders involved and athlete reactions, and listened to feedback from huddle leaders about the factors that facilitated and impeded implementation. Our primary focus was on ensuring huddles were acceptable to coaches, and that they felt as though they could be delivered authentically and enthusiastically. As a larger team, we talked through relevant feedback weekly and modified huddle content and procedures in collaboration with the sport organization partners who were piloting the huddles. By the fall of 2018, we had refined the core components of the intervention, and had a script containing core messaging that could be adapted to a coach's communication style and setting-specific needs. Additional detail about this process is provided in Table 1. The core components were as follows: (1) athletes, coaches, and other stakeholders come together before the start of each game and (2) opinion leaders (coaches, referees) affirm the importance of seeking care for suspected concussion. Huddles are designed to be educational for athletes, addressing care seeking-relevant knowledge and skills (e.g., what to do if a concussion is suspected), and perceived norms and relational consequences related to speaking about a suspected concussion. We note that huddle content evolved over the course of the development process.

We originally conceptualized safety huddles as being so simple that no formal implementation support would be required. However, stakeholder feedback indicated a clear desire for brief training materials about how to lead a huddle. Thus, we worked with an advisory board of four youth coaches (two male, two female) to develop instructional materials for huddle leaders. The primary instructional target was confidence leading

huddles (i.e., self-efficacy); thus, we grounded development of huddle leader training in Bandura's Social Cognitive Theory (Bandura, 1989). Advisors expressed a desire to see videos of others leading huddles using a variety of styles; thus, we employed a primary theory-driven change strategy of modeling. Advisors also indicated they would feel more confident leading huddles if they felt prepared to answer potential questions from athletes about concussions. We therefore incorporated foundational information about concussions into the huddle training, including an overview of concussion symptoms, injury mechanisms, and dangers of playing while injured from a concussion. After identifying instructional targets, we created a wireframe prototype and solicited feedback from our community partners on content, length, and potential formats (e.g., video, PowerPoint, app). They recommended the training be brief (no more than 5–7 minutes) and that huddle leaders be provided a “card” with key messaging in both hard copy and mobile-accessible formats. Ultimately, we developed a mobile-accessible web-based educational platform with some content (i.e., instructional card) printable in hard copy format. Training components, the theoretic target and theory-driven change strategies used for each component are summarized in Table 2.

Feasibility and Acceptability Testing

We piloted safety huddles in Spring 2019 with two soccer teams in and around Seattle, WA region, 12 soccer teams in Savannah, GA region and 12 soccer teams in Statesboro, GA with a goal of finalizing the safety huddle protocol and implementation strategy. The focus of this testing was on feasibility and acceptability. In Seattle, league stakeholders expressed a preference that coaches serve as huddle leaders, whereas in Georgia referees or field supervisors were the preferred leaders. In Seattle, the online educational platform was shared remotely with coaches, and research team members met briefly with these coaches at the start of the season to review huddle instructions and answer any questions. In Georgia, training materials were shared at league-wide meetings and in-person conversations between research team members and huddle leaders. During the season, 12 huddles occurred in Seattle and 61 in Georgia, the majority of which were observed by study team members.

Lessons Learned

In Georgia, we observed that when referees or field supervisors led safety huddles, there was wide variability in how engaged coaches were; in many cases, they did not join the huddle. Coach participation in the huddle is a core component of the intervention. Thus, while we sought to allow setting-specific flexibility in who leads huddles, this flexibility is a threat to intervention fidelity if it means coaches do not consistently participate. Based on this observation, our recommendation is that coaches lead huddles, or that sports organizations otherwise incentivize or encourage coach huddle participation. At the end of the season, we met with league administrators and huddle leaders to get their feedback. One key takeaway was a desire by huddle leaders for pre-game reminders that they are supposed to lead a huddle.

Finalized Implementation Strategy

After the spring pilot, we finalized the implementation strategy based on our observations and stakeholder feedback. Implementation strategy components included the following:

- *Administrative champion:* League identifies a point person who is enthusiastic and invested in the safety huddle concept; this person takes a central role in coordinating with the research team and communicating with teams and coaches.
- *League prioritization:* League administration disseminates general information to sports clubs and/or coaches (depending on organizational structure) about safety huddles through email, expressing support for implementation.
- *Training and technical support for huddle leaders:* The web-based educational resource is disseminated to huddle leaders through email, with follow up to confirm completion and answer questions. Other modes of disseminating these materials, such as at an in-person league meeting, are also possible.
- *Reminders:* Huddle leaders are sent a brief, automated, message 2 hours before each game. Prior to the season, they are also provided with a laminated card, listing core huddle components and language (see Table 1) and encouraged to affix it to a location easily visible during games (i.e., clipboard).

Discussion

Collaborative stakeholder engagement was essential for developing the safety huddle concept and implementation strategy to that fit with the needs, preferences, and constraints of youth sport organizations. Had we not engaged in this open-ended approach to development, the messaging we provided about safety huddle core components would likely have been overly rigid and prescriptive and might have been viewed as inauthentic. We also would not have developed robust training materials for huddle leaders. The importance of collaborative program development is consistent with findings in other sport settings (Van der Veken et al., 2021). Literature outside of the sport setting emphasizes the utility of engaging stakeholders in thinking through implementation barriers and strategies from the outset of the development process as this can help with program sustainability (Dearing & Kreuter, 2010).

This process was not without challenges. A primary barrier involved engaging administrative gatekeepers, as youth sports teams are nested under several levels of organizational administration. For example, in youth soccer, there is a national governing body, a state governing body, regional competitive leagues, and local “clubs” that oversee teams across multiple ages and levels. In our experience, the most important gatekeepers for coach participation were at the “club” level. However, enthusiasm and willingness to allow coach participation were often tied to endorsement of the research at higher organizational levels such as leagues, even if those organizations had limited power or oversight over the smaller clubs. Throughout the development process, we interfaced with national, state, regional, and local youth soccer and football administrators. Endorsement from “higher” levels within respective sport organizations enhanced coach buy-in, and is now proving essential as we

plan for future large-scale dissemination. Understanding the structure, resources, and needs of the national level youth sport organizations has been the key toward developing a scalable youth sport injury prevention program.

We also faced barriers due to the competing demands and values of sport. While the coaches we engaged with during the study were broadly supportive of concussion safety, many simultaneously held strong values related to competitive success. Honoring these competing values was critical for coach buy-in. Functionally, this meant minimizing pre-game time demands of the intervention, and working with coaches to ensure messaging about safety and sportsmanship was not viewed as hindering a competitive pre-game mind-set for athletes. This led to a tension between wanting the messaging to motivate athlete behavior change, and needing coaches to be willing to enthusiastically share this messaging. The tension between adapting interventions to promote sustainability and maintaining fidelity to core program components is present across issues and setting. Prioritizing sustainability, we did not want to develop an intervention that was not acceptable to coaches, so we erred on the side of making adaptations to fit with coach preferences. Our theoretic premise in doing so was that coach buy-in and enthusiasm delivering the huddle message is a critical determinant of whether it is viewed as authentic by athletes, and thus whether it affects perceived norms. Whether the resulting core components were sufficient for athlete behavior change is an empirical question, and further evaluation is warranted.

In summary, we feel collaboration with youth sport organization stakeholders to develop this youth sport injury prevention programs was feasible, and while time consuming, ultimately efficient in that it produced an intervention and approach to implementation that fit well into two different sport cultures. In describing this process, we hope to have provided a model for others looking to develop health education interventions for implementation in youth sport settings. In particular, we highlight the importance of collaboration from the outset of the development process (e.g., working with end users to identify problems and generate ideas), and attending to potential implementation challenges at all stages of development.

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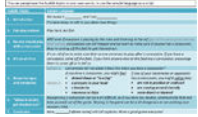




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Table 1

Overview of Iterations of Safety Huddle Card.

Version	Changes made	Impetus for change	Content
1	Not applicable	Not applicable	
2	<ul style="list-style-type: none"> Sportsmanship message changed to be the final part of the message and added in multiple options Stated explicitly that there would be an evolution throughout the season 	<ul style="list-style-type: none"> Coaches did not think that soccer had a problem with sportsmanship in games and so study team added generic, option messages 	
3	<ul style="list-style-type: none"> Shortened significantly No signs or symptoms, but retained mechanisms Sportsmanship statement changed 	<ul style="list-style-type: none"> Piloting for a tournament necessitated a shorter script, which was ultimately successful State leadership wanted wording for sportsmanship that aligned with state and national sportsmanship campaigns 	
4	<ul style="list-style-type: none"> Explicit call and response on dual-sided card Message order changes 	<ul style="list-style-type: none"> Repetition was an issue during piloting and study team created dual-sided card with questions and answers for within-season use 	
5	<ul style="list-style-type: none"> Questions rephrased slightly and more detail added back in Sportsmanship rephrased again 	<ul style="list-style-type: none"> Stakeholders wanted more detail, at least at the beginning of the season, and so on. Added in additional mechanism, since stakeholders wanted to express that sometimes concussions were accidental (i.e., head to ground) Sportsmanship changed to align more closely with multiple sport's national and professional campaigns 	

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Table 2:

Overview of Content and Theory Informing Coach Training.

Section	Theoretic targets	Approach
What is a concussion?	Expectancies, expectations	Animated video using evidence-based content (Giang et al., 2015) about concussion.
How to run a huddle	Self-efficacy, behavioral capability, observational learning	Brief video examples with wide range of coaches and styles of huddle adaptation and implementation. Instructional card outlining key points to emphasize, with suggested messaging.
Concussion: in more depth	Behavioral capability	Links to resources and handouts from Centers for Disease Control and Prevention about concussion.
Sportsmanship	Observational learning	Video examples with range of coaches and messaging related to sportsmanship.

Note. Training materials are available at <https://concussionspace.org/huddle/>