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Effects of Multiple Concussions on Retired National Hockey League Players

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The purpose of this study was to understand the meanings and lived experiences of multiple concussions in professional hockey players using hermeneutic, idiographic, and inductive approaches within an interpretative phenomenological analysis. The interviewer was an athlete who had suffered multiple concussions, and the interviewees were five former National Hockey League athletes who had retired due to medically diagnosed concussions suffered during their careers. The men discussed the physical and psychological symptoms they experienced as a result of their concussions and how the symptoms affected their professional careers, personal relationships, and quality of life. The former professional athletes related these symptoms to the turmoil that is ever present in their lives. These findings are of interest to athletes, coaches, sport administrators, family members, sport psychology practitioners, and medical professionals, as they highlight the severity of short- and long-term effects of concussions.

Keywords: concussions, hockey, depression, social support

Athletes of all ages and skill levels participate in ice hockey. Despite its popularity, participation in this sport involves the risk of injury due to the aggressive nature of the game, where players can reach speeds up to 30 mph (Flik, Lyman, & Marx, 2005). Musculoskeletal injuries occur frequently and injured athletes follow a predictable rehabilitation timeline. Another type of injury, concussion, is a growing concern in hockey (Benson, Meeuwisse, Rizos, Kang, & Burke, 2011; Echlin et al., 2010). Unlike most musculoskeletal injuries, concussions are invisible (i.e., no swelling, stitches) injuries (Bloom, Horton, McCrory, & Johnston, 2004), and often there is no timeline for recovery (McCrory et al., 2009). Furthermore, concussed athletes cannot resume activity until their physical symptoms have subsided (McCrory et al., 2009). These unique attributes of concussions likely present novel challenges for sport psychology researchers and practitioners, especially since little is known about how athletes describe and make sense of their experiences of the invisible, persistent facets of concussion.

Echlin and colleagues (2010) measured concussion incidence among Canadian Junior ice hockey players. The authors found these athletes suffered 21.5 concussions per 1000 athlete exposures, a rate 3.3 times higher than previously thought. In addition to the growing number of concussions, Benson and colleagues (2011) found that multiple concussions caused National Hockey League (NHL) players to miss lengthier periods of time and experience more severe postconcussion symptoms. Commonly reported postconcussion physical symptoms are headaches, dizziness, fatigue, and sensitivity to light (e.g., Benson et al., 2011; Echlin et al., 2010; McCrory et al., 2009). However, there is evidence that athletes may also encounter psychological postconcussion symptoms, including, but not limited to depression, isolation, and anxiety (Chen, Johnston, Petrides, & Ptito, 2008; Johnston et al., 2004). An anecdotal account from Gulli (2011) reported that former professional hockey players experienced symptoms of depression, anxiety, and in some cases suicidal ideation after suffering a concussion. In partial support of this finding, functional magnetic resonance imaging scans of concussed individuals have indicated similar neural responses in brain areas commonly linked with major depression (Chen et al. 2008). Understanding the link between concussion and depression symptoms from the athletes' perspectives would complement this medical mapping and help to inform tailored, individualized psychological skills programs.

Depression and anxiety symptoms may also be perpetuated if severe postconcussion symptoms lead to career termination for athletes in elite and professional sport. Athletes who suffered injury-based career termination have had a more difficult transition to postcareer retirement compared with those who had control over their retirement (Taylor & Ogilvie, 1994; Werthner & Orlick, 1986). Emotional responses of

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athletes who experienced involuntary career termination have included depression, substance abuse, and suicidal ideation (Ogilvie & Howe, 1982; Werthner & Orlick, 1986), although this literature has primarily focused on athletes' emotional responses to musculoskeletal injuries. Given the combination of physical and psychological symptoms of a concussion, athletes who retire as a result of suffering multiple concussions may experience additional distress and reduced quality of life, similar to outcomes reported following serious athletic injuries (Kuehl, Snyder, Erickson, Valovich, & Tamara, 2010; Mihovilovic, 1968). It would therefore be valuable to explore the concussion experiences of athletes who have ended their careers due to multiple concussions to understand how their lives are affected and to identify potential modalities to target in sport psychology mental training and injury management programs.

As part of a multimodal injury management program, social support may positively benefit athletes who suffer psychological sequelae from concussions. Horton, Bloom, and Johnston (2002) found that concussed athletes who attended support groups reported improved mood and affect compared with athletes not attending support groups. Social support has been identified as integral to the psychological recovery within the sport injury and rehabilitation process (Bianco, 2001; Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998) as well as following traumatic brain injuries (TBI; Gan, Campbell, Gemeinhardt, & McFadden, 2006). Although TBI and concussion represent different injury constructs (McCrory et al., 2009), it is possible that concussed individuals may also positively benefit from social support. However, little is known about the role of social support in managing athletes' concussion symptoms and related psychosocial outcomes. Furthermore, social support may be more complex among professional male athletes given the predominant environment of encouragement to play through pain and the unwritten rules of masking injuries from coaches and sport medicine practitioners for fear of being stigmatized by peers as lacking toughness (Safai, 2003; Young, White, & McTeer, 1994). Exploring the complexity of social support in the management of concussion experiences among male athletes would be valuable to help understand mechanisms to reduce their physical, psychological, and social burden.

Concussion research in sport has been developed primarily using quantitative methodologies to describe the physiological and neurocognitive outcomes. These findings have advanced the science of concussions within post-positivist worldviews, while paying little attention to the athlete's personal experiences. Understanding concussions from the perspective of the athlete is important since there is more to the concussion experience than what can be read from medical scans and physical symptoms. To date, there is limited opportunity for athletes who have suffered multiple concussions to share their experiences and the meanings of these experiences using constructivist epistemology. These meanings and the co-construction of athletes' experiences with concussions can advance research and practice and inform the development of effective multimodal interventions aimed at managing concussions. For this reason, interpretative phenomenological analysis (IPA; Smith, Flowers, & Larkin, 2009) was the ideal approach for the current study focused on exploring the experiences and meanings of concussions among former NHL players. The hermeneutic tradition identified within IPA supports the central role of the researcher(s) in the exploration of the lived experiences of the target individuals. In this way, advancing the understanding of concussions can be done by making sense of the lived experiences of former NHL players within the researchers' collective experiences as athletes, researchers, physicians, mental performance consultants, and coaches. The idiographic narrative element of IPA enables an understanding of the individual athletes' concussions within their particular experiences holding different roles and responsibilities on the ice, in the locker room, and at home. The meanings of concussions in the lives of professional athletes can be explored as individual narratives as well as shared constructions of reality used to make sense of such experiences. In this way, IPA is also an inductive approach that involves detailed examination of a small number of cases, and making interpretations across cases. These latter interpretations also foster the integration of researcher experiences, existing theory, and previous research findings if such interpretations are evidenced in the data (Smith, 2004; Larkin, Watts, & Clifton, 2006). Using IPA to focus on the physical, psychological, and social perspectives as central to meaning making of individual interpretations of significant life experiences makes it particularly well suited to explore multiple concussions leading to career termination among professional athletes. Therefore, the purpose of this study was to explore the lived experiences and interpretations of NHL players who suffered multiple concussions during their careers using IPA (Smith et al., 2009). The specific research questions guiding this work included the following: How do NHL players who retired as a result of suffering multiple concussions experience career termination and transition? What role do social relationships play in the experience and recovery from a concussion? Finally, how are NHL players affected physically and psychologically by multiple concussions? These research questions were guided by the first author's experiences as an elite male hockey player, as well as the varied experiences of our research team, and were analyzed within the hermeneutic, idiographic, and inductive traditions of IPA.

Method

Participants

Between November 2010 and May 2011, five English-speaking National Hockey League (NHL) players who each competed professionally for more than 10 seasons and who had been retired for at least four seasons were

interviewed. More specifically, three participants played the majority of their careers in the 1990s, one played equally in the 1980s and 1990s, and one played equally in the 1990s and 2000s. All of the former NHL players suffered severe medically diagnosed concussions during their careers and retired due to symptoms from their concussions. The men were recruited through personal contacts with NHL administrators, members of the sports media, as well as current and former NHL players. Upon receiving approval from the university research ethics board, eligible participants were sent information describing the purpose of the study, method of data collection, and consent forms. Each former NHL player was interviewed individually for a period of 45 to 90 min in a mutually agreed upon location in North America. All interviews were audio recorded using a Panasonic RR-US591 recording instrument. Interviews were transcribed verbatim and stored using the NVivo software package.

Data Collection

The interview guide was created to gather information on *what* the participants experienced (e.g., talk about your first diagnosed concussion in hockey and how it occurred) and *how* they experienced their concussions along with the long-term effects (e.g., describe some of the difficulties you experienced as a result of your concussions; describe how the symptoms of your concussions affected relationships with those close to you). In response to some recent critiques of IPA, the open-ended nature of the interview guide was important to help prevent theoretical and researcher biases from influencing the men's constructions of their experiences (see Allen-Collinson, 2009; Brocki & Weardon, 2006), and to enable dialogue between the former professional hockey players and the interviewer.

I (the first author and interviewer) was an elite-level hockey player (Canadian Hockey League and Canadian Interuniversity Sport) who experienced a number of sports injuries during my hockey career, including concussions. This background enabled me to build rapport with the participants and helped me understand and use jargon commonly used by hockey players during the interviews. In addition, I was trained in qualitative methodologies and conducted a pilot interview with a retired professional hockey player before the main study began. The second author observed a video recording of the pilot interview to ensure I was effectively able to build rapport, explain ethical procedures, and describe the interview format to the participants. I kept a detailed journal comprised of notes taken during the interview and immediately following the discussions that I had with each athlete. My coauthors have expertise in sport and exercise psychology, coaching, and sport medicine and were primarily involved in the development of the interview guide, informing the interview process, and assisting in making sense of the findings from their respective expertise and knowledge in concussions, stress and coping, social support, coaching science, and mental health.

Data Analysis

According to Larkin and colleagues (2006), IPA is a flexible perspective used to approach the analysis of qualitative data. Accordingly, general guidelines for IPA data analysis (Osborn & Smith, 1998; Smith et al., 2009; Willig, 2001) and recommendations for establishing validity in qualitative research (Yardley, 2008) were followed. Members of the research team had different roles in the analysis process. I conducted the first three steps, with the analysis process starting by my reading and rereading of each transcript to get a sense of the athlete's *story*. The second step involved note taking on thoughts and impressions pertaining to the information in the transcript, followed by Step 3, which was a detailed analysis of the events, situations, and experiences discussed in the interview. At this point, the meaning of the events/experiences was explored based on a line-by-line analysis, and my reflective journal was used to interpret the discussions. Step 4 was a collaborative effort with my coauthors that involved an identification and connection of themes using my journal, analysis notes, and delayed literature searches (Smith et al., 2009; Tamminen, Holt, & Neely, 2013). Specifically, we collectively discussed the findings and meanings, shared experiences, and literature knowledge. We collectively identified profiles for each of the participants, along with a detailed narrative and interpretation of their experiences. Each man was assigned a pseudonym to maintain anonymity. These profiles were used along with a delayed literature review to identify emergent themes and to connect themes within and across the players who volunteered for this study. Specifically, we created a coding sheet for the first athlete's profile, and then mapped emergent themes onto this master list for each subsequent player. Therefore, Steps 1 through 3 allowed me to reflect on these findings from my own perspective as a former hockey player who has experienced concussions, and Step 4 enabled my coauthors and me to look for similarities and differences in the men's experiences with concussions.

Results

Participant Profiles

Bruce conceded to playing a rugged style of hockey during his professional career, and related his multiple concussions to a "workplace hazard." Although he felt content with the decision to retire from hockey, he described challenges with his daily life, and certain endeavors in his postathletic career. One of these challenges, about which he wondered aloud during the interview, was whether his inability to recollect details such as names and phone numbers resulted from concussions or a natural aging process. Bruce firmly believed these troubles stemmed from his concussions (and style of play), which has occasionally affected him in his current occupation.

Gary could not say with certainty how many concussions he suffered during his professional hockey

career. However, on a few occasions he suffered major concussions that involved loss of consciousness, which he described as "unfortunate" because he felt medical personnel were more cautious returning him to play after each subsequent collision. Accordingly, and somewhat ironically, Gary was thankful he did not receive medical clearance to play after suffering what turned out to be his final concussion. It was evident in his tone and facial expressions that resurfacing these experiences was painful for Gary; however, he said he felt compelled to share his story to help advance our understanding of concussions and to help future generations of athletes.

James described himself as an aggressive player during his professional hockey career. In fact, he listed a number of times during games where he "could not see" and had "trouble standing up" after being involved in on-ice altercations (fights). James admitted this happened a number of times during his career, which served as yet another reminder of the surprisingly high number of undiagnosed concussions that occurred while he was playing in the NHL. Retrospectively, James noted that multiple concussions altered his mood and he "became a different person." He suggested that this altered mood contributed to his failed marriage.

Paul played hockey in the NHL and another professional league. During the interview, I noted he was visibly frustrated with the quality of care he received from *inside the game* (i.e., team, league), and had it not been for what he called "chance encounters" with caring medical professionals, he feared things may have turned out much differently. Specifically, he admitted he contemplated taking his life as a result of his concussions and the ongoing pain he experienced from his headaches.

Zach provided well-articulated and vivid descriptions of the physical and psychological symptoms he endured immediately following his concussions. In particular, I could sense his vulnerability and uneasiness discussing symptoms he felt mirrored "paranoia." He felt his psychological symptoms were exacerbated by feelings of isolation that resulted from negative interactions with medical professionals. He described feeling that "no one understood" what he was going through, which he admitted may have "led me down a dark path," had it not been for his coach, whom he said he is "forever indebted to."

The aforementioned athletes discussed various concussion experiences that shared common characteristics, including the ambiguous description of their concussion events, physical symptoms, isolation and withdrawal, emotional turmoil, social influences and support, and transition out of sport. These emergent themes are described as embedded in the former NHL athletes' experiences with multiple concussions.

Uncertainty of Concussion Events: *I couldn't tell you how many concussions I had*

Based on the collective experiences of my coauthors and me, it was not surprising that the men were unsure of the number of concussions they had suffered during their careers. As a rule, hockey players do not show they are hurt. Being tough and playing through pain are sought-after qualities for every hockey player, which may involve concealing injuries from opponents, coaches, and medical professionals: "I couldn't tell you really how many concussions I had. My guess would be five or six but probably none documented—even after being knocked out cold."—James

> I can't remember my first one. I have four documented concussions and there are numerous ones that I played through. There's no way I could ever put a number on it because it was never really recognized as a concussion. It is well north of ten.—Gary

The number of heavy collisions and likely undetected head injuries may lead to an anxiety since there is no understanding of the long-term implications that might result from concussion experiences. Furthermore, the men in this study played the majority of their careers in an era when concussion knowledge and research was in its infancy. Although none of the men alluded to the culture or era of hockey explicitly, we interpreted the language used, nonverbal communication, and underlying meanings as being unlikely that these men would have sought medical attention even if they suspected they had a concussion.

Physical Symptoms: *For me it was headaches, sleep patterns, dizziness, and loss of peripheral vision*

The men identified physical symptoms that they suffered after being concussed. Four of the players described vision impairments: "I played in [name of city] that night. I took a face-off and everything went blurry and I got scared. And somehow I held it together I guess. I don't even remember the game."—Zach

> I went to the penalty box and couldn't see out of my left eye. My vision was all blurry. Everything was blurry in the whole eye. Couldn't see out of it, but I played the rest of the game. But I was obviously worried because I couldn't see.—James

Although it is disconcerting that these players continued to play with vision impairments, the culture of hockey encourages a warrior mentality, which includes playing through pain and injury. Even at amateur levels of hockey, athletes are directly (or indirectly) pressured by teammates, coaches, and parents to continue playing despite being injured, and often, are celebrated for doing so.

The men were alarmed by their loss of vision and some feared they would never completely recover: "I had to get used to it because this might be the new me. Eventually things opened up and I got my peripherals back" (Paul). Although they jokingly discussed some of these events, it was evident from the tone of their voices that the uncertain timeline for recovery caused

them distress. It may be the retrospective interviews that enabled this overt display of coping with humor, in particular since the men were describing symptoms that dissipated with time. Prospective interviews with athletes currently suffering such symptoms may reveal a different pattern of emotion.

In addition to the more short-term, transient symptoms of concussions, all five of the participants said they still experienced concussion symptoms (4–14 years after retirement) in their day-to-day lives. For instance, Gary noted, "There aren't too many days that go by where I don't have some type of discomfort in terms of headaches or head pressure. I don't think it will ever resolve itself. At this point it's just keeping it manageable."

> I think I get tired more often than other people. There are days when I just don't want to get up because I'm exhausted. And I don't know how everyone else feels, but I think I go through those lulls where I'm a little more tired than the normal person. I get headaches or those focus problems. Those are things I have to deal with.—James

The most discerning discussions pertained to the uncertainty that the men described about the quality of their lives. For instance, some of the men inquired if there had been new developments regarding the long-term consequences of concussions. It was challenging to interpret expressions of hope and disappointment as the men searched for a cure for their concussions. As Gary noted, "just because you've retired doesn't mean the injury goes away." This desire for more information on the long-term consequences highlights the need for more knowledge dissemination on the topic of concussions.

Participants also discussed persistent symptoms that affected them on a daily basis, such as vision impairments, reading, and memory:

> If I stare at you like I am, everything is a little blurry. I don't feel anything after the first 15 minutes but now as we go on, I feel it a bit more because I'm concentrating and thinking about what I'm saying.—James

> I'm not as sharp as I was communication-wise. I'm not able to focus for long periods of time or process things as well, or as quickly. I use to love to read. But, you know, longer than a half-hour I still can't do it. And if I do, then I'm dead tired. I'm less tired after going to the gym than I am after reading for a half-hour.—Paul

> Sometimes I still have trouble [retaining information]. And I find that I can't remember phone numbers. You can tell me a phone number five times and I can repeat it five times, yet I'll still have trouble remembering it.—Bruce

Although it was not explicitly stated, Bruce, James, and Paul seemed to suggest that their multiple concussions affected their abilities to perform many daily tasks.

Isolation and Withdrawal: *You're on your own little island*

In addition to suffering physically from their concussions, all five participants felt that the psychological repercussions of the injury were detrimental to their professional hockey careers, as well as to the quality of their lives. For example, the athletes all felt they were adversely affected by symptoms of isolation during their concussion rehabilitation:

> For three weeks nobody understood what was happening to me. I'll never forget that because in that three-week period I never felt so alone in my life. And from that point, I went on a real downhill spiral.—Zach

> You're on your own little island. . . . You're not really around the guys because the team doesn't want you around the guys. They don't want injured guys around. They don't want that *epidemic* around and you're cast aside.—James

We interpreted *isolation and withdrawal* as the players' admission of being alone and feeling that no one understood their situations. The athletes said they felt isolated because they were unable to socialize with their teammates. Further complicating their feelings of isolation, participants felt their coaches and general managers specifically encouraged this alienation during their recuperation, or at least did nothing to stop it from occurring. It is understandable that the men said they missed "being around the guys" while concussed because an NHL regular season consists of 82 games over a period of eight to ten months, where teammates spend almost every day together. Teammates often feel like family members, which may have intensified feelings of isolation for the men when they were concussed and separated from their teams.

Emotional Turmoil: *I'm really thinking that I'm losing my mind*

We interpreted emotional turmoil as participants' descriptions of *stress, confusion, and depression.* In particular, the emotional turmoil that the men described varied in intensity and timeframe, yet was obviously a significant factor in their rehabilitation. In addition to feelings of isolation, Bruce and Zach felt they experienced symptoms of anxiety and paranoia in the months following concussion:

> Anxiety. Absolutely. That year was the worst I've ever felt. I really believe that stress was a contributing factor too. Use the comparison of having your foot on a gas pedal and everything is going too fast. Everything was going too fast for me.—Bruce

> It forever changed me because now I have a really good understanding of what it must be like to lose

> your mind in a short period of time. Where it all comes unraveled and you can't make sense of things. You're processing things differently. I would get a thought in my head and this is how I would describe it: the thought would be the pinball and would shoot out and bounce around. But in a pinball machine, there's an out through the flippers. I didn't have a hole in the flippers. So that thought would never leave. It would grow and get bigger and bigger and then it would turn into a migraine headache. Five hours later there are still thoughts bouncing around.—Zach

The men often described this feeling of anxiety and emotional turmoil as normative given the uncertainty surrounding the injury. This was evident in Zach's vivid and well-articulated description of the symptoms of paranoia he experienced. It was interesting how he described his thought processes at the time and retrospectively discussed how these feelings were irrational and uncharacteristic for him. Moreover, both Bruce and Zach mentioned they often felt overcome with emotion because no one could explain what was happening to them. The concepts of isolation and the difficulty of explaining the concussions as an invisible injury were evident in discussions focused on feelings of anxiety and distress.

Gary, James, Paul, and Zach talked about the depressive symptoms they endured as a result of their concussions and the effect on their families:

> Went into a depression. There were two or three months where I was down and out. I didn't feel good. I'd forget everything. Deep depression. Emotional, because you think your career is over. Really, I think my wife came home one day and I think I was under the table crying.—James

> It was very tough for the first couple of years and especially through the depression. That was challenging but I think my family went through it worse than I did. I was full blown, let's say, dementia. So I wasn't really suffering anymore but everybody watching around me was suffering. . . . They were really worried.—Paul

> The first time I went through a really deep depression. It was a very scary time. . . . If you hit your head hard enough, things can get really confusing. Things can come unraveled and you have no control. . . . People don't understand going from, in their eyes, a hockey celebrity to the point where you can't walk out of your house. You can't shave. You have no desire to do anything. You're depressed.—Zach

The complexity of the discussion changed when the men began sharing symptoms of their depression. More specifically, the discussion shifted from occasional joking to somber, pensive, and emotional reactions, even moving some participants to tears. Although they described their symptoms of depression in different ways, we could sense their uneasiness with this topic because of the significant difficulties they endured as a result of their concussions. In spite of the uneasiness of reliving this period of their lives, the men all expressed a need to share their experiences to help future generations of athletes.

In addition to suffering symptoms of depression, Gary, Paul, and Zach discussed thoughts of suicide in those immediate months, which was fostered by the physical pain combined with feelings of isolation, anxiety, and depression. Paul described going online to find information on suicide as a result of his daily pain:

> I was going on websites but my wife didn't know. When she finally found out, she was very scared. I was at the point where I'd be driving along and would think about going full speed and hitting the wall. Just end it. The pain was unbelievable. I had headaches every day for a minimum of three and a half years. Not just a little headache where you want to take an aspirin. I almost wanted to scream. If I had a day off from my headaches it was like I won Super 7. I was ecstatic, I could see, I could think. So many times I just wanted to end it.—Paul

Seeing the expressions of pain and guilt in Paul's eyes was a powerful moment documented in my research journal. Paul was able to revisit the daily pain he experienced while simultaneously experiencing feelings of guilt for contemplating suicide, and described the personal meaning of the persistent headaches and symptoms that emanated from his concussions. The headaches I endured following my concussions were less persistent and dissipated with time, and during the interviews I could not help but think about my life and how those headaches could have affected me if they had continued for months or years.

For Gary and Zach, their thoughts of suicide were discussed by relating to other professional athletes who had committed suicide:

> I don't know if you're familiar with the [name of player] story. . . . He was just at his breaking point and he couldn't deal with it anymore. And I get it. I understand it. You don't want it. Believe me. You don't want this for you or your kids. You don't want to wake up every day with a headache.—Gary

> I'm optimistic by nature but I know what it's like to be pretty down. I have an understanding where some people may not. I mean the suicide stuff. I can understand where those guys get to that place. I would never act on it. But I could understand how the mind would take you there.—Zach

It was evident that discussing suicide was a challenging topic for these men as they had downcast facial expressions and difficulty verbalizing their thoughts. The language used by Gary, Paul, and Zach gave the impression they were searching for docile terms to portray their dark

thoughts of suicide as well as to reassure me they were not suicidal. Perhaps this explains why Gary and Zach discussed suicidal thoughts in relation to other professional athletes.

Social Influences: *"Do whatever you need to do, I am here"* versus *"Just go out and score some more goals"*

Social influences were described as the people in the men's immediate environments following concussions, including family, as well as hockey and medical personnel.

All five athletes discussed the role of their spouses in providing support and encouragement during their concussions. For instance, Paul said, "For at least three years, my wife was like a single mom to our kids. I was like an extra child for my wife and she took complete care of me. She was very patient." Similarly, Bruce noted that, "My wife was well aware of the circumstances of my concussions. Well aware of the doctors' suggestions and recommendations. . . . She was great throughout the whole thing."

> My support system at home was terrific. My wife gave me the freedom to seek out whatever therapy I needed or wanted. If I had to get on a plane and go see a doctor there was no problem—and I have kids at home. So that's a burden.—Gary

All the participants were aware of the burden their concussions created for their wives, although it was not clearly articulated whether this awareness came after years of reflection or was perceived during the event(s). In fact, James was quite certain that being apathetic following his concussions led to his failed marriage:

> My wife and I got divorced. I think concussions were a big reason. I don't think I treated her well after them. I think I snapped. I think I became a different person because of it. I just didn't give a shit for about two years. I didn't realize it because I never really got help. Now I'm conscious of it. . . . But I think for about two years I took everyone for granted and just didn't care.—James

Athletes in this study described the social support they received from coaches very differently. For instance, Zach said the care and concern that he received from his coach was certainly not the norm in hockey. In fact, he described how he broke down and cried when his coach pulled him aside after a game and asked if he was okay. Zach was shocked that his coach noticed that something was not right and was helping him seek care. He now feels "indebted" to this coach, who Zach described as telling him: "I don't care what the doctors are saying. I don't care what the fans or media are saying; you're not playing, and we're going to get you some help." However, some of the other men described very different stories, such as Paul who mentioned that coaches and hockey personnel wanted to see concrete evidence of his injury. "My coach couldn't see an x-ray of my concussion. No matter what coaches, general managers, and players say, they didn't respect concussions at that time." Paul suggested this attitude was a reflection of the lack of knowledge pertaining to concussions even up to 5 or 10 years ago. Based on conversations with the other participants and personal experience, I fear that the majority of concussed hockey players, professional to amateur, who played during that era had experiences similar to Paul.

Similar to the support some received from coaches, the men had differing encounters with medical professionals after suffering their concussions:

> [Name of doctor] was phenomenal. I remember some emotional times when my doctor actually had tears building up. It wasn't just a science for them. I wasn't just a file and they weren't just collecting data. I was a human being. I was a husband. I was a father. I was an athlete who had his career ended and my doctor really, really cared.—Paul

In contrast, Zach discussed one doctor who attempted to justify his feelings of "things starting to unravel" by downplaying some of the symptoms he was experiencing and advising him he would feel better once he scored a couple goals:

> I remember feeling emotion and my eyes swelled up and I got scared. I said, "Doc, I don't care about scoring goals right now." The doctor said, "Well I don't know what else to do. Do you want to take some time off?" I just walked out of there.—Zach

Zach was visibly frustrated with this interaction. He felt he was not sufficiently supported by this particular medical professional and he felt this relationship strained his recovery from concussion.

Professional Sport Transition: *I'm not a hockey player anymore; I'm just a regular guy*

We interpreted participants' descriptions of *OK it's enough, career over, stripped identity,* and *not a hockey player anymore* as being related to their transition from professional hockey. Specifically, players discussed the events surrounding the termination of their professional hockey careers, as well as the obstacles they faced transitioning to their post-hockey careers.

All five players spoke in detail about their career termination. Bruce, James, and Paul noted that, in addition to receiving recommendations from their doctors to discontinue their careers, retirement from professional hockey was influenced by discussions with their families. Paul said, "I had spoken to my wife and she told me this was the final straw. She said 'If you don't stop, we're done. I'm not going to watch you kill yourself. I'm leaving and taking the kids, don't call.'"

> It was my family and I . . . I weighed the pros and cons of the amount of years that I could probably play and the money I could make. I had already played a lot of years and the only thing that was keeping me in the game was that I hadn't won the Stanley Cup. But when I looked at my family, I wanted to be around them more. I also wanted to help them and not be a f***ing vegetable just sitting there. —James

> It was a group decision that I made with my wife. We weighed the pros and cons of coming back and I'm like "OK, it's enough. I don't want to get punched in the head anymore. I don't want to feel bad anymore." I wish I played more games. But I won the Stanley Cup. I got to lift it above my head. . . . I got to meet some great people and had a pretty good run.—Bruce

Although Bruce, James, and Paul had discussions with their spouses regarding the continuation/termination of their athletic careers, there was a clear divide between their experiences. After one of his concussions, Paul said he was unable to sit or stand upright for any length of time, so he spent the majority of his days lying down in a dark room. He felt that his role as a husband and father was greatly diminished so he understood his wife's hard-line approach when he contemplated resuming his career. In contrast, Bruce and James credited their decision to retire to open exchanges with their spouses, which enabled them to reflect on their careers, families, and long-term health. It is unclear whether having some sense of control over their retirement ameliorated their retirement process. Regardless, Paul, James, and Bruce said they were confident they made the right decision based on their doctors' recommendations and discussions with their families. Alternatively, Gary and Zach said they were forced to retire because their doctors did not give them medical clearance to play. Both of these men said they may have continued playing had they received medical clearance. Gary described his effort to return to play:

> After my last concussion, I worked diligently to put myself in a position where I could return to play. I went in to see the doctor and he asked me how I was doing and I said, "Good. You know, I'm doing alright. A few more days, maybe another week and I think I'll feel well enough for training camp. I think I'm just about there." And he looked at me and said, "I appreciate your effort and I applaud your courage but I'll never clear you to play. I can't. I could never have that on my conscience. It would be my responsibility if you went out there and anything happened." When I asked he told me my career was over. When I was driving home I was obviously upset, but at the same time I was relieved because I needed someone to do that for me. Because I would have kept trying to come back and play until I died, or somebody told me to stop.

Zach had a unique anecdote on this topic. He said, "A hockey player compacts his short career into what the average person does in 35 years." This notion provides insight/rational into some participants' desire to continue their athletic careers after suffering significant concussion symptoms. All of the men noted they have a very short period of time to pursue their dream of playing in the NHL and to provide for their families.

Regardless of how their retirement was initiated, participants were no longer identified as a professional hockey player after they retired. For some, this made their retirement more challenging:

> My identity became the hockey player. You're signing autographs, you're on TV and in the print, and your identity gets wrapped up in that. And I don't think it's necessarily an ego thing. It's more how you're identified with people. My identity was stripped from me when I retired and I had to reinvent myself.—Paul

> Losing your sense of identity is the hardest thing in the world. You go on the road, you go to the rink, it's that atmosphere that you had. Now you're home and you don't feel great all the time. It's the weirdest thing to retire so young because it's all you've ever known. You're not a hockey player anymore; you're just a regular guy.—James

Having invested themselves in amateur and professional hockey for the majority of their lives, it was not surprising these men identified themselves as hockey players. Moreover, loss of identity was evident in their somber facial expressions and tone of voice while discussing their early retirement.

In addition, two participants felt they have been limited in their post-hockey careers because of ongoing symptoms from their concussions:

> As active as I am, my concussions have hindered my ability to work at the highest level. I'm afraid that I'll get into a situation where I wouldn't be able to fulfill a commitment or an obligation. So, I wouldn't be able to travel if I became a scout, general manager, or coach because my head wouldn't allow me. I can get through my day and do stuff but if I need a rest, I can take a rest. If I need to take a nap, I can find a way to go take a nap in the middle of the day. If you have a job where you're being relied upon, you don't have that kind of flexibility.—Gary

> I know that I could never be an 80 hour-a-week guy on Wall Street. Numbers, computer screens, phone calls, high pressure, high stress—no. My head would explode. Also, I want to go back to school because I want to finish everything, but I can't do it. My head won't allow me to manage my family, schooling, and my business.—Paul

Based on the dialogue in the interviews, it was clear that the men were frustrated that the head injuries they

suffered during their hockey careers not only prevented them from attaining post-hockey careers they desired, but also lingered as daily reminders of their lost identities.

Discussion

Former NHL players were interviewed to better understand their lived experiences with multiple concussions. Based on the findings, professional athletes were (and remain) significantly affected by their head injuries in their postathletic careers and personal relationships. This study provided the first qualitative account regarding the severity and persistence of physical and psychological effects of concussions on retired professional athletes. These findings advance research on the long-term postconcussion effects and add to the ever-increasing list of possible outcomes, including chronic traumatic encephalopathy (Stern et al., 2011) and mood disorders and dementia (Gavett, Stern, & McKee, 2011; Stern et al., 2011). This line of research is still in its infancy (McCrory, 2011), and our results demonstrate, through personal accounts of former professional hockey players, the long-term effects of concussions on multiple quality-of-life domains.

All players in this study felt debilitated by headaches, visual impairments, and other physical symptoms that resulted from the concussions they sustained throughout their careers. As reported in other studies, participants said they often hid these symptoms from teammates, coaches, and medical professionals to continue playing (Clover & Wall, 2010; Delaney et al., 2002). It is possible they were perpetuating the *macho* attitude of playing through pain (Defrin, Schramm, & Eli, 2009) that is often evident in male professional sports. Men are more likely to downplay or hide injuries, in particular as athletes of traditionally violent and aggressive sports, such as hockey, in order to protect their identities as "tough guys" and to abide by the culturally normative ideals associated with being male (Messner, 1990; Young et al., 1994). This protection of hegemonic masculinity is likely stronger among athletes playing professional sport, with the critical lens of teammates, NHL administration, and a substantial audience of spectators and fans ever present (Melnick, 1992; Morra & Smith, 1996). As such, there is no leniency to straying from the gendered and cultured views of how males should manage injury—especially an invisible injury that was relatively unknown even a decade ago. Based on our findings, a greater awareness of the physical symptoms that occur both immediately and persist long term can inform management programs to help concussed athletes rehabilitate and avoid returning to play while symptomatic (Safai, 2003), and also increase awareness at a societal level to reduce the burden of male athletes' living up to hegemonic masculinity standards.

Athletes were removed from competition by their coaches and medical trainers when they were unable to hide their concussion symptoms. Similar to research findings following sport injury, this lack of clearance to play hockey increased their feelings of loneliness and isolation (Bloom et al., 2004; Quinn & Fallon, 1999). In line with some emerging research with athletes (Chen et al., 2008; Johnston et al., 2004), participants also experienced symptoms of anxiety and depression, and some reported suicidal ideation, after suffering their concussions. While it is difficult to differentiate whether symptoms of anxiety, depression, and suicidal ideation were initiated by participants' concussions or career termination, the combination of these psychological states suggests that professional psychological counseling should be available to athletes during their rehabilitation from concussion and transition to their postathletic careers. For example, psychological skills training has been found to help facilitate a healthier transition from sport (McKnight et al., 2009; Taylor & Ogilvie, 1994; Kontos, Collins, & Russo, 2004). In addition, it is important to highlight that the men in our study discussed their symptoms of depression and anxiety although males are often less likely to report these types of health concerns (e.g., Nolen-Hoeksema & Aldao, 2011). Some researchers and clinicians argue that this hesitation to report and discuss mental health is a product of gender socialization such that men—and especially professional male athletes—are "supposed to be" tough (Messner, 1990; Safai, 2003; Young et al., 1994). Therefore, when working with male athletes who have suffered concussion injuries, sport psychology consultants need to be aware of the potential likelihood that these men may downplay the need for medical and psychological counseling and rehabilitation.

Similar to evidence focused on elite skiers (Bianco, 2001) and individuals suffering TBI (Kreutzer, Gervasio, & Camplair, 1994; Kreutzer et al., 2009), the men in our study specifically identified their spouses as being the most supportive people throughout their lengthy recoveries. The athletes also discussed the positive support provided by their coaches and medical professionals (Bianco, 2001; Rees & Hardy, 2000), although some also pressured them in unsupportive and controlling ways. An interesting finding from our study concerned some of the negative comments from coaches and physicians that silenced the athletes. Given that only a few athletes discussed this topic, researchers should consider examining this topic in more depth. Specific to sport, Rees (2007) has argued that social support is an important coping mechanism that helps athletes resist, and as needed, recover from injury, while also fostering motivation. Based on the current findings, support from family (directly from spouses and indirectly from children) was imperative for managing the symptoms of a concussion and the aftermath of career termination. Even though spouses, coaches, and medical staff members appear to be the foundation of the athletes' social support network, it was interesting to note that teammates were rarely mentioned in the interviews and appeared to play a limited role in the supportive network both during and following concussions. This is contrary

to most sport-related literature (e.g., Bianco, 2001; Rees & Hardy, 2000), and future research is needed to focus on the dynamics of the team when an athlete suffers a concussion. A better understanding of the teammate's knowledge of concussion symptoms and the burden and isolation during injury is also needed.

The current study enhanced the overall understanding of concussion experiences among former NHL players. However, we acknowledge some limitations when interpreting these results. First, the players were retired up to 14 seasons at the time of the interview, and therefore the recollection of specific events, emotions, and experiences with respect to their concussions may have been hindered. Second, there has been some recent debate on the applicability and usefulness of using thematic analysis with IPA (Chamberlain, 2011). However, we were careful to be transparent throughout our data collection and analysis, and the categories presented are illustrative of the analytical interpretation we used. Third, playing style was not included in the selection criteria (e.g., scorers vs. tough guys). It is possible that athletes who play a more aggressive style (i.e., tough guys) and who fight more often than others would have different experiences with concussions than players less involved in physical contact (i.e., scorers). There has previously been much discussion of the role of hockey enforcers in the literature from a sociological perspective (cf. Colburn, 1985; Weinstein, Smith, & Wiesenthal, 1995), and it is possible that the experiences of enforcers would be different from other hockey players given their aggressive playing style and propensity to play through injuries on a regular basis.

Despite these limitations, the current findings offer practical insights for athletes, family members, coaches, sport administrators, sport psychology experts, and medical professionals in all levels of sport by helping to understand the short and long-term psychological effects of concussive injury from the athlete's perspective. Participants in this study noted they did not always report symptoms of a concussion, which allowed them to continue playing despite being symptomatic. Findings from Delaney and colleagues (2002) suggested that professional athletes might have increased motivation (e.g., financial) to hide concussion-like symptoms and continue playing. In addition, participants in our study noted they were able to hide symptoms of a concussion because it is an invisible injury. Bloom et al. (2004) posited that concussions were unique from other injuries because there are no visible signs, such as crutches, swelling, or stitches. These current results expand previous literature by adding that participants may take advantage of the invisibility of concussive injury and hide symptoms of a concussion from others. This suggests that concussion education may be particularly important to ensure the long-term health and well-being of these athletes. Findings from this study may also benefit stakeholders such as the International Ice Hockey Federation, NHL, Hockey Canada, and USA Hockey to make hockey safer for athletes of all ages and skill levels. Participants in the current study reported they experienced physical symptoms such as headaches and difficulty reading 4 to 14 years after retiring from professional hockey. At the third International Consensus Conference of Concussion in Sport, McCrory and colleagues (2009) called for researchers to implement longitudinal approaches to gain a more thorough understanding of the implications of this injury. Our results concur with this suggestion, and we hope that our empirical results can be used to help researchers and clinicians work with athletes, coaches, and family members to help treat, manage, and assess the short- and long-term symptoms of sport-related concussions. As is evident from our findings, concussions have implications for athletes that extend far beyond the termination of their athletic careers by affecting their interpersonal and professional lives on a daily basis.

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