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Tech Talk: How the NHL is using Catapult technology to reduce injuries

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In every sport, teams try to utilize technology and the data it provides to give their players an edge. In the NHL, that is no different. With over 35% of all injuries occurring to the soft tissue, such as the groin, the NHL and Catapult have teamed up to begin tracking player movement in hopes that the data will be able to help trainers determine exactly how much use their players' bodies take on.

During these early stages of data tracking in hockey, injury reduction remains the key focus, but don't expect it to remain that way forever as statisticians find ways to utilize the data they'll be getting from the technology.

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As Catapult, an Australian-based company that first became known for player tracking in Australian Rules football and later American football, makes the transition into hockey and the NHL, researchers must learn a new data language in order to quantify metrics when on the ice.

“We’ve had to learn to speak a different language,” Ben Peterson, Catapult’s sports performance manager, tells SI.com. “No longer are we speaking football, we have to interpret skating load and volume.”

What is it?

The Catapult system includes a 3.5-ounce device that slides into a pouch on a compression baselayer worn under shoulder pads. That device uses algorithms to track player movements, deciphering how fast a player is moving, how much force a player sustained in a hit and even which leg is working harder than the other.

How does it work?

While grabbing the information remains a technical component reserved for accelerometers, gyroscopes and algorithms, the more important question is how does that information get disseminated? Peterson, who holds a PhD, says that he’s been able to look at metrics for skating and filter data to determine how much of a player’s total work volume came from skating. Add that to information about bursts of work and hits and Peterson has plenty of data to wade through.

Why’s it significant?

Hockey loses more player time due to injury than any of the five major sports, according to a Toronto-based research study, showing an average team loses 242 player games each season.

[daily_cut]Peterson says that Catapult, for example, can help trainers understand how much stress of the game is placed on the groin and how much a player was banged up in front of the net—contact load data will help decipher that. But with groin injuries so prevalent, that has proven a key metric.

“We have been able to tweak it look not at just total load, but volume of individual skating strides on the right leg versus the left leg and the rate of force on each of those,” Peterson says. Using that data can help determine if production on one leg differs from another, which can lead to further injuries or show a player struggles while returning from injury.

Already Peterson has seen cases where coaches and trainers changed practice plans based on total volume figures determined from the system. “By reducing the total volume, they saw a pretty big drop in groin injuries and injuries in general,” he says. “The coach was comfortable because he thought he was still getting the work out of them he needed. They got rid of the extras that didn’t give them bang for their buck.”

What are the implications in the world of hockey?

As more data accumulates, Peterson believes the injury reduction component will serve as just one key aspect of the system. “As more coaches see the data and understand how to apply it, I believe there is a huge tactical component,” he says. “What is the load and intensity on guys during a penalty kill? When a work rate rises above X does our penalty kill become less efficient? It will make a difference when (coaches) make better informed decisions about player substitutions and pace of the game.”

Already, the system has started to show the “true metabolic cost” of a shift. An average hockey player will play six to eight shifts of about 45 seconds each period. But downloading Catapult data shows that those shifts aren’t equal. Instead, Catapult can see that a player, for example, went hard for eight seconds and then coasted after an icing call. After the puck dropped again, they may have had 26 seconds of intense play followed by more coasting and then a final burst of a few more seconds.

By breaking down the work rates within each shift, “coaches and trainers will possibly find a more specific way to train guys to get them in shape to do that type of work as opposed to 45 seconds of straight hard work.”

What are the downsides?

Using Catapult takes buy-in. We've seen this buy-in across other sports, but getting teams on board early in hockey will require trainers being able to convince coaches that the hard data gives them something their eyes can't see by themselves.

Who's using it already?

Catapult has two NHL clients—The Buffalo Sabres and the Philadelphia Flyers, who have had the system the longest—but NHL rules limit the system's use to in-practice only.

Catapult also has clients in other professional leagues and the NCAA, which allows the system during games. Currently Catapult is engaged in a project with the University of Minnesota hockey team and kinesiology department to see what injury-related data they can mine from the in-practice and in-game data.

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"We are trying to be very scientific with our approach to a massive data pool," Peterson says. "We want to be able to walk in and say, 'Hey, we did this yearlong study and here are the peer review papers that show how X, Y and Z apply to your team."

What's the future of it going forward?

Peterson believes that since the NHL has proven progressive when it comes to data, we may see the Catapult system allowed in-game, possibly even as a fan component. Either way, with the rise we've seen Catapult take in the NFL, where the number of teams using the systems has reached the teens, the relative newness of Catapult to hockey gives the company an opportunity to expand in the NHL (where the company expects to at least triple its team number by the end of the season), NCAA and elsewhere.

The rise of Catapult may serve as welcome news to soft tissue all through the world of hockey.