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Goal Scoring In Women's Ice Hockey Reflecting On Scoring Recommendations – Pyeongchang Olympics & Finnish Playoffs 2018

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Abstract

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The purpose of this case study was to determine how do women in top level score goals reflecting on scoring recommendations. The other purpose was to compare if there are differences in goal scoring between women's ice hockey in the international level (Olympics) and national level (Finnish Playoffs). Also men's ice hockey and goals scored by Canada and USA were compared with the results.

The design, or strategy, of this study can be seen as a (comparative) case study. Previous research has been done on goal scoring as a whole, but not any specifically on scoring in women's ice hockey. In the theoretical part the thesis takes a look on the women's ice hockey in general, the Olympics and Women's National League in Finland. The framework of the literature review and the chosen variables in the study comes mainly from the Finnish Ice Hockey Association recommendations in goal scoring. Other parts of the literature focus on instructive information on goal scoring and references from men's ice hockey.

The study covers only the goal scoring against the goalie and does not tackle any reasons behind the goals (e.g. puck possession, number of scoring chances etc.). The biggest defect of this study is the number of analysed goals. Is the sample big enough to draw conclusions about scoring in womne's ice hockey in general?

The key conclusion was that many of the scoring recommendations in men's ice hockey being analysed in this study seem to support goal scoring also in women's hockey. Also many of the results seem to be in line with the men's results, even though there are some differences too. The small amount of goals made from the blueline in women's ice hockey was striking as well as the big percentage of goals that included crossing the center line. When compared with men's ice hockey the number of one-timers to score a goal is lower – On the other hand the number is clearly bigger in the Olympics than on the national level. The key outcome of this study was a list of scoring recommendations for coaching women's ice hockey.

Keywords
Ice hockey, women's ice hockey, scoring

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Introduction

We are living very interesting times in women's ice hockey. Just some time ago, the first female hockey player, Kendall Coyne Schofield, participated in the NHL skills competition and skated as fast as the other, male, competitors around the rink. For some, this might seem like no big deal, but for me at least, it means more. It shows the whole world, how much and how fast, women's hockey has evolved during the last ten years or so, and it shows the direction where the sport can also go. Women are not only skating fast, they are also scoring some really nice goals.

The idea of this thesis originated in Vierumäki where I was studying Sports Coaching and Management. I wanted to learn more as a coach about goal scoring in general, but also noticed there were many goal-scoring analyses done in men's hockey, but not any in women's ice hockey. The main object of this comparative case study was to see how goals are scored in women's ice hockey reflecting on the scoring recommendations. It was also fascinating to see if there are differences in goal scoring between women's hockey in the international level (Olympics) and national level in Finland (Playoffs). Also men's ice hockey and goals scored by Canada and USA were compared with the results. There were many ideas about how the thesis and the study would be conducted, but something was missing until it was decided to conduct the framework of the study by utilizing the Finnish Ice Hockey Association recommendations on scoring.

This bachelor's thesis scratches just the surface of goal scoring in women's hockey. Probably many countries have their own statistics about the goals that their national team has scored, but maybe not that many have compared the results with other countries or on this level. This thesis covers the playoffs in Finland 2018 (number of goals 96) and the Olympics in South Korea 2018 (number of goals 89). One defect of this study is the amount of data analysed, the amount of goals. The thesis covers only the goal scoring against the goalie and does not tackle any reasons behind the goals (e.g. puck possession, number of scoring chances etc.).

In the theoretical part this thesis takes a look on the women's ice hockey in general, the Olympics and women's national league in Finland. The framework of the literature review and the chosen variables in the study comes mainly from the Finnish Ice Hockey Association focus points in goal scoring. Other parts of the literature focus on references from men ice hockey and instructive information on goal scoring.

1 Women’s Ice Hockey

The modern era of organized women’s hockey began in the late 1980s when the first international invitational tournaments were organized, culminating in the first IIHF European Women’s Championship, played in 1989 in Düsseldorf and Ratingen, Germany, with Finland as its first winner. One year later the first IIHF World Women’s Championship took place in Ottawa with Canada winning on home ice, and in 1992 the International Olympic Committee welcomed women’s ice hockey as an Olympic discipline. The first Olympic women’s ice hockey tournament was played in Nagano 1998. (IIHF)

Women’s world ranking (Picture 1) top two spots in 2018, as in the previous history, holds United States and Canada. Number three is Finland, number four Russia and numbers five and six Swizerland and Sweden. There are 38 countries in the female world ranking. (IIHF)

2018 WOMEN'S WORLD RANKING

RANK	TEAM	POINTS	MOVEMENT
1	United States	4200	0
2	Canada	4060	0
3	Finland	3910	0
4	Russia	3830	0
5	Switzerland	3655	+1
6	Sweden	3615	-1
7	Japan	3555	+1
8	Germany	3475	-1
9	Czech Republic	3470	0
10	France	3225	+1
11	Austria	3200	-1
12	Denmark	3130	+1
13	Norway	3130	-1
14	Hungary	3015	0
15	Slovakia	2930	-1

Picture 1. Women’s Word Ranking 2018 (IIHF) – Top 15 countries

In Finland, women’s organized ice hockey began in 1982, when the first official national league was established with ten teams. The first championship was won by HJK from Helsinki. In 1985, as the number of teams kept growing, the first division was established under the national league. In the 1980s and 1990s the most succesful teams in the na-

tional league were Ilves from Tampere, Shakers from Kerava and Kärpät from Oulu. In the late 1990s and beginning of 2000 a new era started as the ”eternal bronze team” Blues from Espoo won several championships in a row. (Mennander, A. & Mennander, P. 2003) The latest championships have been won by Espoo, Jyväskylä and Oulu. Espoo Blues won the championship in 2013, 2014 and 2015, JYP Jyväskylä won the title 2016 and Kärpät from Oulu has won two championships in 2017 and 2018. The champion in 2019 was Espoo Blues. (FIHA)

1.1 Women’s Olympic Tournament PyeongChang 2018

Women’s ice hockey in PyeongChang 2018, was the sixth time that women’s hockey has been part of the Olympic Games. The teams and groups were seeded according to the 2016 IIHF Women’s World Ranking. The tournament included the top-five nations, two qualifiers and host team Korea. The tournament was played with two tiered groups. The top-four ranked teams were seeded in Group A, the other teams in Group B. Group A consisted of countries Canada, USA, Finland and OAR (Olympic Athletes from Russia). Group B included countries Switzerland, Sweden, Japan and Corea. After the preliminary round (Picture 2) USA was leading Group A and Swizerland was leading Group B (IIHF)

Standings

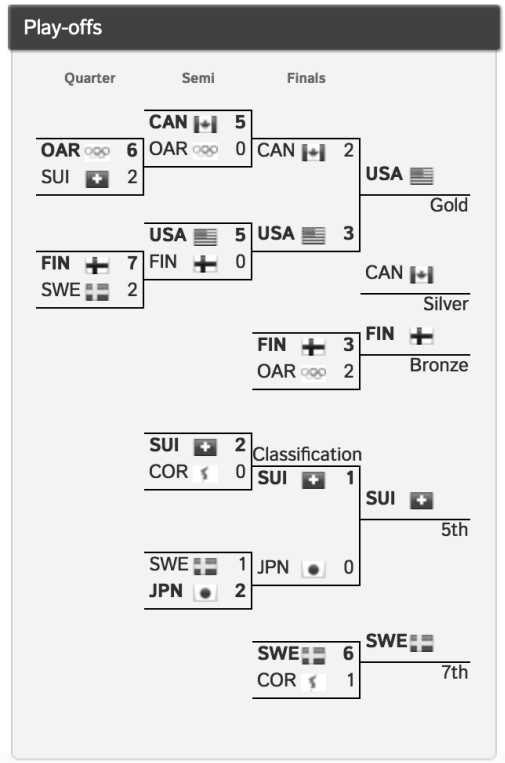
Preliminary Round

R	Team	GP	W	OTW	OTL	L	GF:GA	PTS
Group A								
1	CAN	3	3	0	0	0	11:2	9
2	USA	3	2	0	0	1	9:3	6
3	FIN	3	1	0	0	2	7:8	3
4	OAR	3	0	0	0	3	1:15	0
Group B								
1	SUI	3	3	0	0	0	13:2	9
2	SWE	3	2	0	0	1	11:3	6
3	JPN	3	1	0	0	2	6:6	3
4	COR	3	0	0	0	3	1:20	0

Picture 2. Womens’s ice hockey standings after preliminary round in PyeonChang Olympics 2018

In total there were 22 games played in the tournament, including the bronze medal game and the final. All of the teams played 5-6 games during the tournament. In the play offs

USA and Canada proceeded to the Olympic Final where as Finland and OAR proceeded to the bronze medal game (Picture 3). USA won the gold, Canada silver and Finland bronze. (IIHF)



Picture 3. Womens's ice hockey Play-offs in PyeongChang Olympics 2018

1.2 Finnnish Women's National League 2017-2018

Finnish Women's National League was called *Naisten SM-sarja* since it was established in 1982. Season 2017-2018 was the first time it was called *Naisten Liiga*. The aim for the name change, as well as the new logo, was a profile lift for the women's top league in Finland. (Leijonat)

In total, there were 8 teams in the Finnish Women's National League during season 2017-2018 (Blues – Espoo, HPK – Hämeenlinna, Ilves – Tampere, KalPa – Kuopio, KJT - Kerava, Kuortane – Kuortane, Kärpät – Oulu, Lukko – Rauma). In the regular season all teams played 30 games. Each game consisted of 60 minutes regulation time and in the event of a tie, winner was decided by a 5-minute overtime. Ties after overtime were decided by a shootout. In the play offs the regulation time was the same, but the overtime was 20 minutes long. (FIHA)

Two best teams in the regular season (Picture 4) proceeded straight to the semi-finals, standings 3. -6. Proceeded to the quarterfinals. Winners of the quarterfinals proceeded to the semi-finals. The winners of the semi-finals proceeded to the finals (best of five games), losers to the bronze game (one game). There was no National League qualification during season 2017-2018, as the League was expanded to 10 teams for season 2018-2019. (FIHA)

Sarjataulukko Lataa Excel-tiedosto

# JOUKKUE	O	V	JAV	JAH	H	TM - PM	ME	P
1. Ilves	30	21	5	2	2	139 - 41	98	75
2. Kärpät	30	17	4	3	6	147 - 62	85	62
3. Blues	30	16	2	4	8	125 - 74	51	56
4. HPK	30	16	1	3	10	87 - 66	21	53
5. Kuortane	30	17	0	1	12	102 - 73	29	52
6. KalPa	30	14	2	1	13	112 - 92	20	47
7. Lukko	30	3	0	0	27	34 - 155	-121	9
8. KJT	30	2	0	0	28	24 - 207	-183	6

Picture 4. Finnish Women's National League preliminary round standings season 2017-2018 (FIHA)

In the quarter finals, Blues (Espoo) and Kuortane proceeded to the semi-finals against regular season winner Ilves (Tampere) and regular season second Kärpät (Oulu). Ilves won against Kuortane in the semi-finals and Kärpät won against Blues, proceeding to the finals. Kuortane won their first ever national league medal in the bronze game against Blues. Kärpät won the National League Championship against Ilves with 3-1 game wins. (FIHA)

2 Analysing Goal Scoring

Scoring has been one of the focus areas in the Finnish Ice Hockey Association strategy for several past years. When looking at scoring and playing against the goalie the focus is in the quality of the shot, readiness, speed and the element of surprise. The following areas are especially taken into consideration:

- How to increase the efficiency of different kind of goal scoring
- Puck carrier → Shooting
- Non-puck carrier → Supportive actions

The player is recommended to find out how the goalie is playing and to study scoring. The puck carrier should focus on different ways of scoring and especially in one-timers, shooting quickly after possession of the puck and getting the goalie to move laterally when carrying the puck and shooting. The non-puck-carrier (the potential goal scorer) is recommended to get close to the goal in order to make the job of the goalie harder. The player without the puck is expected to win their own 1 on 1 battle and to struggle to get his/her stick free, the bladeon ice and offer a place for the puck-carrier to pass the puck over the center line. (FIHA focus areas 2018-2019)

2.1 Straight Attack vs End Zone Play

This study is not analysing what happened in the game before the scoring situation (e.g. turnovers, forecheck etc). In the *FIHA focus areas 2018-2019* though, there are recommendations on scoring based on scoring area and whether it is a straight attack or end zone play in question and therefore also this study takes these two elements of the game into concideration.

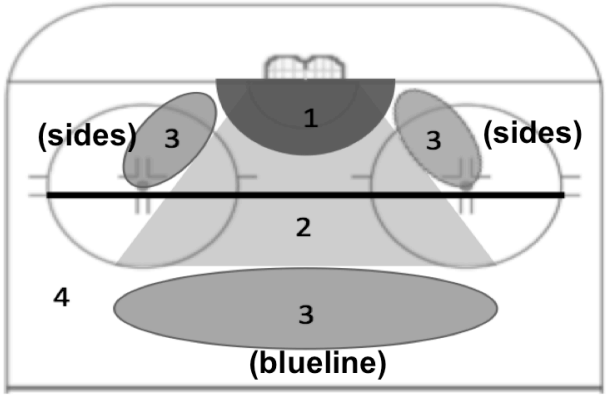
In their study *Analysing reasons behind the goals in ice hockey* (2015, p. 15) Elomo and Poikonen are defining End Zone Play as follows: “End-zone play means those situations, which are created by “forced play”. Common to different categories is that real scoring chance has developed from puck holding or passing chains in the offensive zone. Rush and turnover turns into end zone play, if the attacking team can hold the puck at least 5 seconds, and it is not straight consequence from stealing the puck.” Elomo and Poikonen (2015, p. 13) define the straight attack, or rush, as follows: ” Rush means controlled attacks from defensive zone or neutral zone, when the end result of these attacks is goal. Combined factor to these are, that the goals are scored against the opponents organized

defense."

In their study Elomo and Poikonen (2015, p. 25) analysed the SM-League (season 2011-2012) and 2194 goals that were scored. They found out that most goals (1349) are scored in even strength and inside the even strength goals all three categories are really close to each other. On offensive zone play 483 goals (36%), on straight attacks 443 goals (33%) and on turnovers 423 goals (31%).

2.2 Scoring Areas

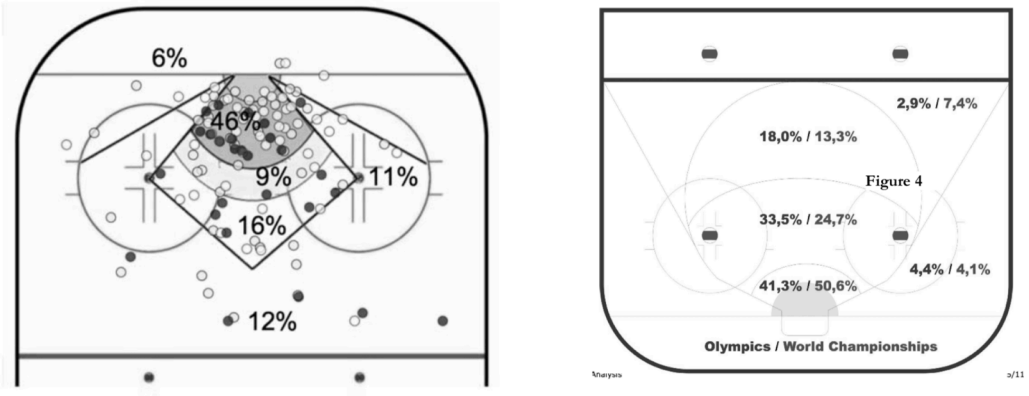
There are many different ways of defining the scoring area. The Finnish Ice Hockey Association model has used 4-5 different goal-scoring areas during the past years. FIHA model is used as a modified version in this study (Picture 5). Area 1 covers the grease and 1 meter from the grease. Area 2 covers the area from the goal posts leading to the blue line up until the B dot circle line (excluding area 1). Areas 3 cover basically the best shooting area on the blue line and the areas on the sides, next to area 1 and 2. Area 4 covers the areas with white background. (FIHA Focus Areas 2018-2019)



Picture 5. Scoring areas (Modified FIHA)

In his study *Shooting With A Purpose In Ice Hockey* (2012, p. 9) Scott McMillan presented data from the 2010 U20 WC (Magnusson 2010), the 2006 Olympics and 2005 World Championships (Saarinen 2006). Picture 6 shows that 61 % of the goals in the U20 WC were scored in the "grease pan", where as in the Olympics 72 % of goals came from this area and in the World Championships the number was 75 %.

a) b)



Picture 6. Goals by scoring area in the U20 WC 2010 (a). Goals by scoring area in the Olympics 2006 and World Championship 2005 (b). (Modified McMillan 2012, p. 9)

In the article *Where do the NHL's best snipers shoot from?* (2016), Andrew Berkshire is writing that with accurate shot location tracking, Sportlogiq has found that nearly half of all goals in the NHL are scored from the 'inner slot' area, very close to the net. In his article Berkshire presents shot attempts of top-five goal scorers (Ovechkin, Stamkos, Seguin, Pacioretty and Pavelski) in the NHL over the past four seasons (article published in 2016), and where they shoot the puck from. It is interesting to notice, that not all the top scorers shoot from the same areas and might have different strenghts as goal scorers varying from sniper-types to deflecting the puck in. As a final statement Berkshire sums up that for the average hockey player, getting as close as possible to the net to take your shots is the best way to give yourself a chance to score. However for the players who are elite at putting the puck in the net, shot location doesn't matter as much as simple getting your shot off.

In addition to the scoring area, several studies have been looking at where on the net pucks go in and in his study Scott McMillan (2012, p. 11-12) is stating that the studies have come up with similar results. For example he is presenting the findings of Magnusson (2010) on the U20 WC in 2010. Niels Garbe (2013, p. 13-14) on the other hand, is showing another example from the study done by Mensonen and Salo on the 2005 World Championships and the 2006 Olympic Games, where they switched back to the old five whole figure with the confirmation that 58.4% of all the goals in the two events were scored low (Picture 7).

a) b)

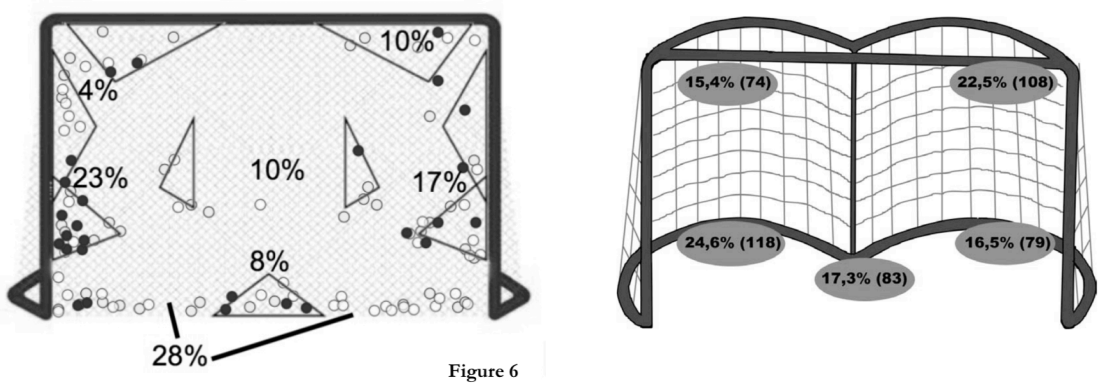


Figure 6

Picture 7. Goals by area of the shot in the U20 WC 2010 (a - McMillan). Goals by area of the shot om the Olympics 2006 and the Wolrd Championships 2005 (b – Mensonen & Salo)

FIHA focus areas 2018-2019 is suggesting different ways of how to play the game situation in different areas in order to score, whether it is a straight attack or end zone play and depending on if the player is the puck-carrier or the non-puck-carrier, whether it's a shooting or passing situation and also taking into concideration how the goalie is usually playing the game situation. (FIHA Focus Areas 2018-2019)

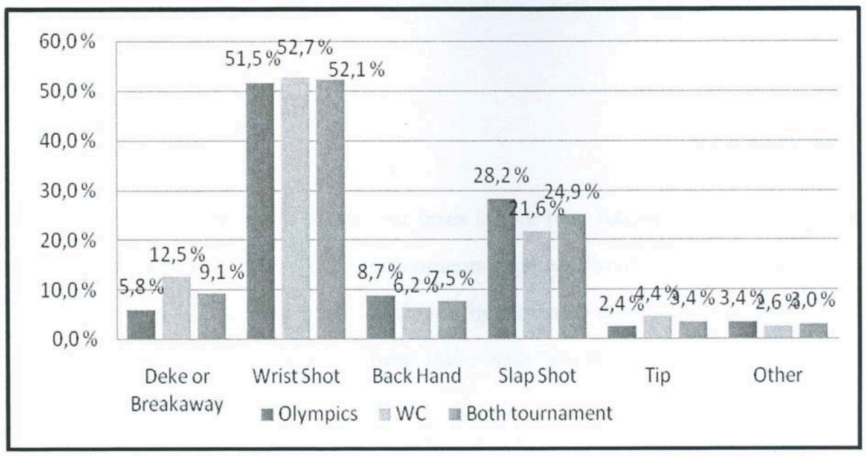
In his article *Shooting With A Purpose* (2018), Taylor Brendan is also breaking down hot and cold zones of the net based on the scoring area. In the area closest to the goalie getting the puck upstairs on both the forehand and backhand along with a willingness to attack the net in traffic can often be the difference in a game. In the area outside of the dots looking far side will open up a short side high shot to find the top corner. Alternatively, butterfly goalies have the most difficultly stopping shots low blocker. Inside the post, 12 to 18 inches off the ice, above the goalie's pad is the most difficult shot for a goalie to stop. In the slot area the best areas to shoot for are high glove side and low blocker side and if moving horizontally across the slot with the puck will expose the five-hole. In the high slot/point a hard, low slap shot is a great option for scoring but is also useful for teammates to deflect or collect a rebound opportunity. A middle to high net snap shot is another great option where the goalie can easily lose sight of the puck.

2.3 Type Of Shooting & Quality Of The Shot

In their study *Analysing reasons behind the goals in ice hockey* (2015, p. 10) Elomo and Poikonen are presenting five different types of shooting based on a IIHF Coach Manual

from 2007 and the shots being the wrist shot, snap shot, slap shot, flip shot, and backhand shot. Four of the techniques the puck is released from forehand side. Wrist shot is the most accurate shot as the puck is in contact with the stick throughout the shooting motion. The wrist shot can also be deceptive, as a pass can be made from the same motion. The snap shot is similar to the wrist shot with the exception that the blade of the stick is removed from the puck immediately after the shot is taken. The shot is almost as powerful as a slap shot but can be released as quickly as a wrist shot, but is not as accu- rate. The slap shot is the most powerful of all the shots. The draw back with the slap shot takes the longest to release. The objective of the flip shot is to get the puck up high in the air as quickly as possible. “Scooping” the puck carries this out. The flip shot is valuable when a player is in close on the net and the goalkeeper is down on the ice. The backhand shot is both fast and accurate is can be used by a player who has faked a move to the forehand side to bring the puck to the backhand for a quick shot on the goalkeeper. There is also a backhand flipshot. It is similar action as on forehand, but it is executed from backhand side.

In a study done by Mensonen and Salo 2008 they found that over 50 % of the goals they saw came from a wrist shots (Picture 8).



Picture 8. Technique of scoring, Olympic games vs. World Championships and together. (Mensonen & Salo 2008, 41)

Many other studies back up the findings or Mensonen and Salo. For example, in his study *Defenseman goal scoring analysis from the 2013-2014 National Hockey League season* (2015, p. 8) Michael Marshall described studies by Andrews and Garbe about NHL scorers in 2006/2007 and also research done by the Toronto Star newspaper about NHL 2011-2012 season and came to a conclusion that the wrist shot is the most common shot in hockey to score a goal.

In his study *Shooting With A Purpose In Ice Hockey* (2011, p. 5-6) Scott McMillan is also discussing the power of the shot vs. accuracy and power with accuracy: “When practicing shots a player must train themselves to shoot hard and accurately, with as quick a release as you can. Anyone who has shot a hockey puck understands that at some point it is easier to shoot more accurately if you take a shot that’s less than your most powerful. That by putting less power in the shot, you can shoot much more accurately. So that may leave a debate about which is more important, power or accuracy and which should you learn first. It is important to do them both at the same time, but power should be the primary focus on and accuracy, while accuracy should be secondary. It is important to shoot as hard as you can, and try to be accurate, rather than shooting as accurately as possible and trying to shoot hard. That may seem like a trivial difference, but the difference is huge.

The reason has to do with motor unit recruitment and synchronization. When a muscle is placed under tension, motor units are recruited based on size. “The smaller, slow twitch motor units fire first followed by progressively larger, fast twitch motor units, which further increase the tension. The muscle generates maximum force when all motor units are recruited and are firing at their maximum rate.” (Ackland & Elliott & Bloomfield 2009 117-119) When you first start an exercise that requires the recruitment of more and more motor units there will be a significant “lack of coordination between agonists, stabilizers, and antagonist muscle groups. This lack of muscular coordination is displayed most prominently when beginner resistance trainers attempt to push a barbell in a straight line on the bench press. As the neuromuscular system becomes increasingly proficient with the performance of an exercise, the coordination of the muscles improves, facilitating performance.” (Ackland et al. 2009, 119) This is why it is important to always shoot your hardest while learning accuracy. If you were to shoot at 50% effort and learn accuracy, as you shoot harder and harder, you recruit more and more motor units, those units are going to lack coordination, and you will have to learn accuracy all over again. This learning of accuracy will have to occur every time you incorporate a new motor unit, or every time you increase effort on the power of the shot. (McMillan 2012, p. 6)

Therefore, a player should shoot their hardest right from the start, and try to be accurate as accurate as possible. Shooters should always aim at a target, but in the beginning the target might be quite large. The entire hockey goal may be the original target for a five to eight year old beginner. When the shooter consistently hits the net with their hardest shot, the net can be divided into four, with the shooter aiming at one of the four quadrants. As the shooter becomes more proficient the net can be divided into six, then nine squares. Eventually top shooters will aim at a part of the net that is as small as the puck itself. The key though, is to shoot as hard as you can the whole time you are learning to shoot accu-

rately, so you don't have to learn accuracy twice. (McMillan 2012, p. 6)

In hockey if you compared the top 10 shooters in the world, you would certainly see some technical similarities, but they would all have slightly different form. The key is when practicing to shoot, you get immediate feedback on the power and accuracy of the shot. It is also important to spend a great deal of time working to shoot with the quickest release possible. (McMillan 2012, p. 5)

In ADM (American Development Model) article *Catch and Release: Shooting tips for 12U and beyond* (2018) Michael Rand is interviewing Kenny Rausch, the youth ice hockey director for USA Hockey. Rausch played at Boston University in the early-to-mid-1990s, and the game he remembers as a young player is much different than the one today. "When we were growing up, we saw 70-foot slap shots going in," Rausch said. "Goalies were smaller and there was different equipment. But it's a dying art, and young kids really aren't strong enough to properly take a slap shot anyway." So Rausch says the focus on shot selection should be on wrist shots and snap shots. He cites a telling stat: Over the last five years in the NHL, slap shots account for fewer than 7 percent of all goals. "Unless you're Alex Ovechkin or Steven Stamkos, you're better off with a snap shot," Rausch said. "At 12U, I would stay away from slap shots. Even when you take a one-timer, it's just about being strong with the bottom hand. That's a key part of being a goal scorer is having a strong bottom hand. And you absolutely want to be moving your feet as you are shooting

2.4 Type Of Scoring

FIHA focus areas 2018-2019 emphasizes three types of scoring: **One timer, quick release and shooting from skating with lateral movement**. One-timer means that the player is brave enough to try to shoot the puck straight from a pass without taking the puck into control, even from a bad balanced position if possible. Quick relase means that the puck is taken into control after a pass, but the shooting happens as quickly as possible without further dribbling of the puck. Shooting from straight skating includes the idea of lateral movement with the puck so that the goalie has to make a move sideways and/or go on his/her knees. (FIHA focus areas 2018-2019)

2.4.1 Quick Release and One-timer

Scott McMillan is describing quick-release in his study *Shooting With Purpose In Ice Hok-*

cey (2012, p. 15) from a goalies perspective: ”The most important part of goaltending is what happens before the save; The goalies preparation. The goalie has to move to get centred in the net, square to the puck, and at an appropriate depth from the goal to get into the best position to make the save. (Magnusson 2010; Corsi & Hannon 2002, 49, 52, 57; Rossiter 1996,69; Daccord 1998, 76, 83, 112) It makes sense then, that the best way to score is to shoot before the goalie is ready.”

The quick release shot is a very difficult technique to master. Working with the Slovakian U20 team Stefan Mikes found that “it was difficult [for players] to receive the pass and shoot without delaying. They always did some [stick]-handling. Only one in ten players at the start could effectively quick release the shot from a medium distance.” (Mikes 2011) At such an elite level one in ten players being able to shoot with a quick release is a surprisingly low number. It is important, especially with young players to have patience and understand that their accuracy will suffer if they are focusing on their release. With players under 14 or 15 it is best to teach a “catch and release” quick release rather than a one-timer. A catch and release shot is when they receive the pass and use that reception as their wind up for a wrist shot. The catch and release shot is still probably the most effective weapon for an older player, but a one- timer can be introduced as the player reaches their mid to late teens. (McMillan 2012, p. 16)

McMillan continues: ”The goal with the quick release shot isn’t to pick a small corner, but rather get the puck by the goalie before he is ready to make the save. You can have players set up for quick release shots off an offensive zone play (cycle) or off of the rush, or maybe the first step could just be stationary pass and shoot in the slot. However it is taught, the player is going to miss their target more often when focusing on release. On this shot, the player should allow a larger target area, shooting to give themselves a little more room for error in regards to their target. Shooting quickly has to be driven in to players heads. They constantly have to be preparing to shoot with a quick release.”

In their study *Scouting technical skills in ice hockey* (2012, p. 15), Aalto and Räihä say: ”One timer is a shot which is produced with only one touch after receiving the pass. The key elements of the one timer are looking towards the goal, making an immediate shot after the receiving, producing fluent movement of the whole body and weight transferrin towards the same direction where the puck goes. (International Ice Hockey Centre of Excellence 2012g.)”

Aalto and Räihä (2012, p. 15) continue: ”When scouting the one timer, the concentration is on weight transfer, readiness to play after the shot, accuracy and efficiency. One-timer shot can be made by wrist shot, snap shot or by a slap shot and very rarely with backhand

side. It is difficult for the goalkeeper because there is less time to prepare for the shot than normally."

In the ADM article (2018) Michael Rand presents tips by Kenny Rausch, the youth ice hockey director for USA Hockey, on how players can improve their shooting and scoring today. One point of emphasis Rausch returned to throughout the conversation was how important it is to under-handle the puck. "If you want to score goals, it has to be one-touch or two-touch with the puck. Two-touch is basically you're receiving the pass, maybe stop it with your stick or skate, and then the next touch is the shot."

In his study (2013, p. 37) *Goal scoring analysis based on team level in National Hockey League in the season 2006/2007* Niels Garbe analysed NHL goals by top ranked, middle ranked and bottom ranked teams (Picture 9). For the one-timer shot he found out, that top ranked teams scored 52,7 % of the goals with a one-timer, middle and bottom ranked a little over 50 %. For a quick release type of shot (recieve a pass and shoot), all of the teams scored around 14 % of the goals with that type of shot.

	Way of scoring					
	Top ranked teams		Middle ranked teams		Bottom ranked teams	
	Amount	Percentage	Amount	Percentage	Amount	Percentage
Unable to tell	51	1.8	72	2.7	80	3.7
One timer shot (*Tip)	1529	52.7	1328	50.1	1089	50.2
Recieve a pass and shoot	405	14	372	14	301	13.9
Receive the puck, short puck control, then shot	379	13.1	350	13.2	290	13.4
Puck control, then shot	353	12.2	342	12.9	264	12.2
Breakaway	107	3.7	125	4.7	87	4
Walk out	43	1.5	36	1.4	29	1.3
other	32	1.1	28	1.1	27	1.2
Total	2900		2653		2168	

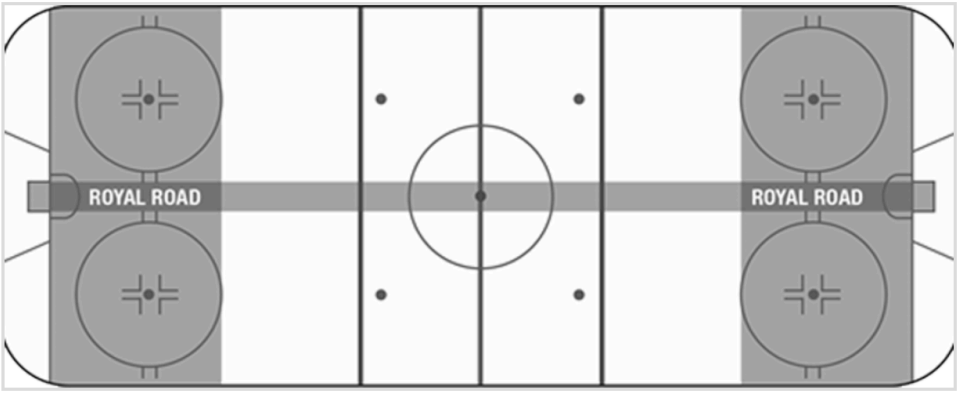
Picture 9: Way of scoring in the National Hockey League 2006/2007 (Garbe 2013, p. 37)

2.4.2 Lateral Movement

In their study *Analyzing reasons behind the goals in ice hockey* (2015), Elomo and Poikonen are presenting scoring situations from the goaltender perspective presented by Koho & Luukkainen, 2012, SJL, 2008 and Tuononen, 2006. One of these is the Regular shot. In

these kind of situations goalie should usually position himself at the top of the crease and make the save by using appropriate fundamental saving technique according to the shot. Good puck control should be established in these kinds of situations. Goalie should be able to cover the puck or deflect it outside the dangerous scoring areas. Another type of scoring situation is a shot is from lateral movement. It is important for goalie to stay in controlled basic stance during the lateral movement and maintain readiness to make save motion at any time. Goalie should place himself at the top of the crease and stay in the middle line between the puck and center of the net during the movement. On the other hand a scoring chance can happen not only from a lateral movement, but from a lateral pass. For a shot coming above the top of the circle goalie should attempt to move on feet, and to stop his movement on top of the goalie crease by maintaining/gaining the depth before making a save. In situation occurring closer than top of the face off circles, goaltender most likely doesn't have enough time to move on feet, in order to gain the puck line. Therefore, goaltender should slide on the ice in order to gain the puck line and to be able to cover bottom of the net. (Elomo & Poikonen 2015, p. 5-6)

When talking about lateral movement, the term Royal Road emergers many times. Chris Boyle is discussing the topic in his article *The Most Important Line on the Ice You've Never Heard Of* (OMHA 2019): "A former New York Rangers goaltender and current TV Hockey Analyst for the Rangers and msg.com, Stephen Valiquette has taken his exhaustive study (he reviewed 100 games during the 2014/15 NHL season) in a new direction with the introduction of the Royal Road (Picture 10). Valiquette has identified what he believes is the most important line on the ice, the line he believes supports the existence of shot quality. The Royal Road is a line that goes directly through the middle of the ice from one net to the other. It separates the ice into two equal parts. Valiquette has observed that a puck crossing this imaginary line immediately preceding a shot increases a shooter's scoring opportunity by over 10 times. When the puck crosses the Royal Road, it changes everything because goalies have limitations to their movements and while laterally tracking they are forced to open up."



Picture 10: Royal Road (Valiquette & Boyle, OMHA 2019)

The most effective way to create offence in the NHL is a pass across the Royal Road. This is judged as any pass that goes across that line below the tops of the circles that results in a shot on goal. It accounts for 22% of all goals that Valiquette has reviewed. This type of movement is essential to goal creation because when the puck moves laterally with speed in this manner, it doesn't allow the goaltender to remain square because they struggle to set their depth and angle, making the save more difficult. (Boyle 2019)

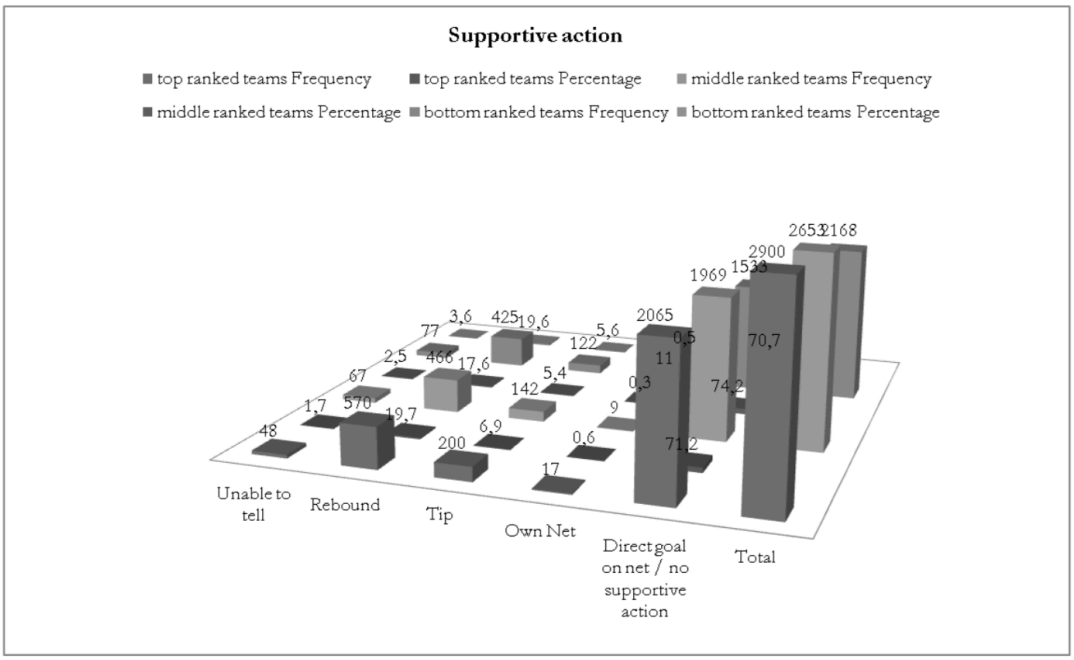
If a player enters the offensive zone with speed, a defense happily exposes the exterior and attempts to clog the middle. They do this with good reason. They are attempting to deny the attacking forward the ability to cross the Royal Road. Studies show exterior shots have a low probability for success and Valiquette's study identifies a shot from above the face-off circles and no lateral movement will results in around a 3% chance to score. If the attacking forward is able to cross the Royal Road through the slot, his chances increase to 33%. (Boyle 2019)

Kenny Rausch, the youth ice hockey director for USA Hockey agrees (ADM article 2018). The best scoring chances come not just from prime areas on the ice but from moving the puck – either via skating or passing – across the center of the ice below the tops of the circles. That imaginary center line, called the royal road, helps unlock a lot of scoring keys, Rausch says. "If you can make the puck cross the crease, the royal road, from low to high or high to low, chances of scoring go up 60-70 percent," Rausch said. "The overall theme is to learn the royal road and learn the value of underhandling and goal-scoring will go up dramatically."

2.5 Supportive Actions

FIHA focus areas 2018-2019 lists supportive actions in goal scoring as follows: **Screen, rebound, loose puck and deflect/tip in**. In the situation of supportive actions (usually e.g. after a shot from the blue line), the puck-carrier is recommended to shoot the puck quickly without taking control of the puck and aim the puck high. If there is time and space the player is also recommended to move or pass the puck laterally (shoot or pass). The non-puck carrier has to stay alert and act quickly (low stance, win 1-on-1). The non-puck-carrier has to be ready for another rebound, not to dodge the puck and/or try to deflect the puck. (FIHA focus areas 2018-2019)

In his study (2013, p. 38) *Goal scoring analysis based on team level in National Hockey League in the season 2006/2007* Niels Garbe shows that the direct goal on net/no supportive action is the most used common way of scoring by all teams (Picture 11) counting over 71 %. Rebound for the top ranked teams counted for 19,7 % and tip 6,9 %.



Picture 11. Supportive actions (Garbe 2013, p. 38)

2.5.1. Screen and Deflection / Tip In

When attempting to tip in a shot, it is paramount that a player gets in front of the goalie in order to screen him at the same time he is trying to tip. “Taking shots through traffic (players in front of goaltender) will obviously distract the goaltender or deny him the opportunity to see the puck.” (Walter, Johnston 2010) It is more difficult to tip the puck from this posi-

tion but since screening and rebounds are easily the most effective ways to score (Nykvist 2007) it is definitely worth the trade off to make the shot harder for the goalie to see. (McMillan 2012, p. 28)

McMillan continues with coaching recommendations for the screen players: “When working on Goal Mouth scoring it is important that all drills start with the player trying to get directly in front of the goalie in order to screen. The only time a player does not want to be directly in front of the goalie is if the original shot is coming from a very high scoring area. In this case it is better to “slip” off to the back door.”

McMillan (2012, p. 31) also takes a look at the shot taken byt the defenceman on the point: “The most important thing is first to get the shot by the shot blocker; the worst thing a defenseman can do is have his shot blocked at the point. The second thing they have to try to do is get the puck to the goal mouth area. He can do this with either a direct shot, or indirectly off the end boards or by a tip or redirection. The point shot “doesn’t have to be [the hardest] shot, just get it to the front of the net. There is nothing more frustrating for a coach than having two forwards open in front of the net and the defenseman has a shot blocked because he’s trying to shoot harder rather than quicker (Sator, 2006)”.

In his article *The Most Important Line on the Ice You’ve Never Heard Of* (2019), Boyle says that as the position has evolved, goaltending has become so strong that teams need to crowd the front of the net and layer it with players to obstruct a goaltenders view. If a goaltender cannot view the puck it decreases his chance for success because he cannot set for the play and relies solely on positioning and luck to succeed. When players effectively layer in front of the goaltender their chance for success increases. 10% of all goals are scored in this manner. Boyle presents also that deflections count for around 8 % of the goals made. “Deflections are extremely challenging because they initially presents themselves as a red shot. A goaltender sets for the initial path and plane but when they are altered, the maximum coverage becomes compromised. The closer the deflection to the net, the lower chance for goaltender success.” (Boyle 2019)

In his study *Goal scoring analysis based on team level in National Hockey League in the season 2006/ 2007* (2013, p. 11), Niels Garbe is describing a tip in and referencing a study done by Mensonen and Salo (2008): “A tip in is performed by deflection or redirecting a puck past the goaltender into the net. During the World championship of 2005 4.4 percent of all goals were scored by tip ins and during the Olympic games 2.4 percent.”

2.5.2. Rebound / Loose Puck

Scott McMillan (Shooting With A Purpose In Ice Hockey 2012, p. 25) is describing rebound from a goalie perspective: “While most of the shooters focus in this area must be a quick release, he must also attempt to get the puck elevated, at least over 11’ or the height of the goalies pad. This will force the goalie to do more than just get a skate to the post. He will have to get a glove there as well in order to make the save. Remembering that the goalie wants to get his pad, then glove, then chest across in that order, you can see in the two pictures of Roberto Luongo stretching to get to the post that it takes more time and a better push for him to get his glove across on the left. If shooters in the goal mouth can get pucks away very quickly, they will score a lot of goals. If they can get pucks away very quickly over the 11’ (the height of the pad) they will score more, and if they can get pucks away quickly to the top part of the net they will score more still. If the goalie does get set before a shot can be released, there will not be holes to shoot at.

In their study attachment Elomo & Poikonen (2015, p. 40) have information about SM League rebounds. In straight attacks there were total of 74 rebound goals, counting 17 % of all the goals. In the offensive zone play the number of rebounds was 107, counting 22 % of the goals.

3 Purpose of the study

The main purpose of the study was to find out how goals are scored in women's ice hockey reflecting on the scoring recommendations. It was also fascinating to see if there are differences in goal scoring between women's hockey in the international level (Olympics) and national level in Finland (Playoffs). Also men's ice hockey and the goals scored by Canada and USA were compared with the results. There was almost the same amount of goals in both of the analysed subjects so it made more sense for the comparison. In addition, both the Olympic tournament and the playoffs are played in a short time period where almost every game counts when looking at the end result, so the nature of both subjects was similar.

There was only one previous study that was found about women's ice hockey game wise (In Finnish: Naisten jääkiekon joukkuepelianalyysi) by Juha Melkko in 1998. He came to a conclusion that there were surprisingly few elements in the game that differed from men's ice hockey based on his study findings. Even though Melkko studied the women's game the results could not be utilized in this study straightforward and the study was made already 20 years ago. Previous studies on goal scoring have been done on the men's side.

3.1. Research problem(s)

How do women in top (international) level score goals reflecting on scoring recommendations?

How do players in the Finnish National League score goals compared to the international level in women's ice hockey?

How do women in the Olympics and the Finnish National League score goals compared to men's ice hockey?

4 Research methods

The goal scoring analysis was completed using the PyeongChang Olympics 2018 and the Finnish National League play offs season 2017-2018. The number of goals analysed in the Olympics was 89 and in the play offs 96.

4.1. Study Design

The design, or strategy, of this study can be seen as a (comparative) case study. The nature of a case study is that it is up-close, in-depth, and detailed examination of a subject of study (the case: Olympics & Playoffs), as well as its related contextual conditions. In the quantitative part the aim was to look at five different areas in goal scoring (framework based on the recommendations of FIHA in scoring): Game situation (straight attack or offensive zone play), goal scoring area, supportive actions (rebound/loose puck, tip in/deflect, screen), type of scoring (one-timer, quick release, lateral movement either skating or as a pass) and the area of the net (up right, up left, down right, down left and five hole).

4.2. Data Collection

Using the IIHF website provided by Olympic Channel it was possible to see the goals that were scored in the Olympics. The video quality was very good presenting replays of all the goals. There were highlights of the goals from different camera angles, close ups and slow motion. Two of the games could not be analysed because they were missing from the web site. The games provided by the Olympic Channel were full games, so in order to catch all the goals, the goals needed to be found from the game video by using the minutes of the game and wind the game video back and forth. There were no separate goal highlights available, except maybe one game or two in the Internet and YouTube.

There was more work to be done to be able to see all the goals from the Finnish play offs. The initial idea was that to get all the goals as original versions stored and uploaded on the computer. Using the Fanseat website it was possible to see almost all of the games in the play offs, but it was not possible to directly upload the video clips. In order to get the videos I contacted all the Finnish National League head coaches and asked if they could provide me with their game videos. Everybody was very helpful and finally I could get all the videos except one team. At the end I decided to use Fanseat clips from that one particular team. The game videos took a lot of space in the computer so they were uploaded

on external memory. Finnish playoff videos were also full games most of them. Two teams had been using Steva Hockey, the video analysis software, and the goals could be able to see separately. Also there were goal highlights available from some of the games by Yle. The biggest work was again winding the game back and forth to be able to catch the goals. Also the video quality was not as good as in the Olympic Channel. The games were played in small rinks with poor lighting, the location of the camera varied a lot, there were not close ups or replays. Sometimes one goal needed to be watched over and over again and still it was not clear where in the goal the puck finally ended up.

4.3. Data Analysis

The initial idea for the study was to take a look at the goal scoring the same way as the Finnish youth national teams do, also in order to be able to compare the results later on. As I was starting off the work I decided to delimit the work so it wouldn't get too big and narrow down the variables to include basically only the game against the goalie. I looked at the previous studies that had been done, found out what type of system they used or variables that were looked at. At the end, it was decided that the variables were based on the FIHA recommendations on goal scoring.

The data was gathered in excel using numeric values 1 for every goal. Every goal was listed in their own separate row in excel so the table could be pivoted later on. The results were later on sorted and compared in excel and graphs were made to illustrate the results better. A pivot chart in excel was used in order to cross analyse the results.

4.4. List Of Variables

Therea are six categories of variables in the study including the game situation (straight attack or offensive zone play), goal scoring area (areas numbered 1-4), type of shooting (wrist shot, slap shot, rebound, deflect, back hand), supportive actions (rebound/loose puck, tip in/deflect, screen), type of scoring (one-timer, quick release, lateral movement either skating or as a pass) and the area of the net (up right, up left, down right, down left and five hole).

Game Situation

Straight Attack - Controlled attacks from defensive zone or neutral zone, when the end result of these attacks is goal.
End Zone Play - Scoring chance has developed from puck holding or passing chains in the offensive zone.

Scoring Area

For the scoring area there was four different areas used, Area 3 split into “sides” and “blueline” (see Figure 5). The variables were named Area 1, Area 2, Area 3 (sides), Area 3 (blueline) and Area 4.

Type Of Shooting

Wrist shot – Goal made with a wrist shot. Snap shots are included in this category
Slap shot – Goal made with a slap shot
Rebound/Loose puck – Goal after a bounce that comes into play from goaltenders initial save or a loose puck situation
Deflect/Tip In - Situation where puck changes its trajectory after the initial shot
Back Hand – Goal made with a backhand shot

Supportive Actions

A shot from area 3 (blueline) – Initial shot coming from area 3, but not resulting in a goal.
Rebound/Loose puck - Goal after a bounce that comes into play from goaltenders initial save or a loose puck situation
Deflect / Tip in - Situation where puck changes its trajectory after the initial shot
Screen (scoring team) / Screen (defending team) – Goal including a situation where goaltenders clear view to the puck is blocked by a player (scoring team or defending team player)

Type of Scoring

Royal Road – A goal including a pass that goes across center line / Royal Road (see Figure 10)
Lateral move (left-right) / Lateral move (right-left) – Goal scored after player moving laterally on the ice with the puck.
Lateral pass (left-right) / Lateral pass (right-left) – Goal scored immediately after a lateral pass across the ice. These can happen from various places and distances from the net.
One-timer - A goal made with a one-timer shot, a shot made immediately after receiving the puck with only one touch
Quick Release – A goal made with a quick release, receiving the puck being the first touch and shooting the puck being the second touch

Area of the net

For the area of the net there was five different variables used, same type as Mensonen & Salo used for the 2005 World Championships & 2006 Olympic Games (see Figure 7 b). The variables were named Up Right, Up Left, Down Left, Down Right and Five Hole.

5 Results

In the PyeongChang Olympics there was total of 22 games played in the women's ice hockey tournament. Due to technical reasons, the data about the goals could be analysed from 20 games. In the Finnish National League playoffs there was total of 21 games. When goals scored by penalty shot or goals in empty net were taken off from the data, there were total of 89 analysed goals in the Olympics and 96 goals in the playoffs. In the Finnish play offs one goal could not be analysed due to technical reasons. In the Olympics the number of goals analysed by Canada and USA in this study was 33 and the number of golas for the other countries in the Olympics was 56.

The average goals per game in the Olympics were 4,5 and in the Finnish playoffs 4,6. The number of power play goals in the Finnish playoffs was 19, counting around 17 % of all the goals. The number of power play goals in the Olympics was 30, counting around 28 % of all the goals. The scoring analyse doesn't make any difference if the goal was scored on full strength or power play / short-handed.

Straight Attack vs. End Zone Play

In the Pyeonchang Olympics 2018, 46 % of all the goals made in the women's ice hockey tournament, were straight attacks and 54 % End Zone Plays. In the Finnish women's National League playoffs 2018, 36 % of the goals were a result of a straight attack and 64 % End Zone Play goals (Figure 1).

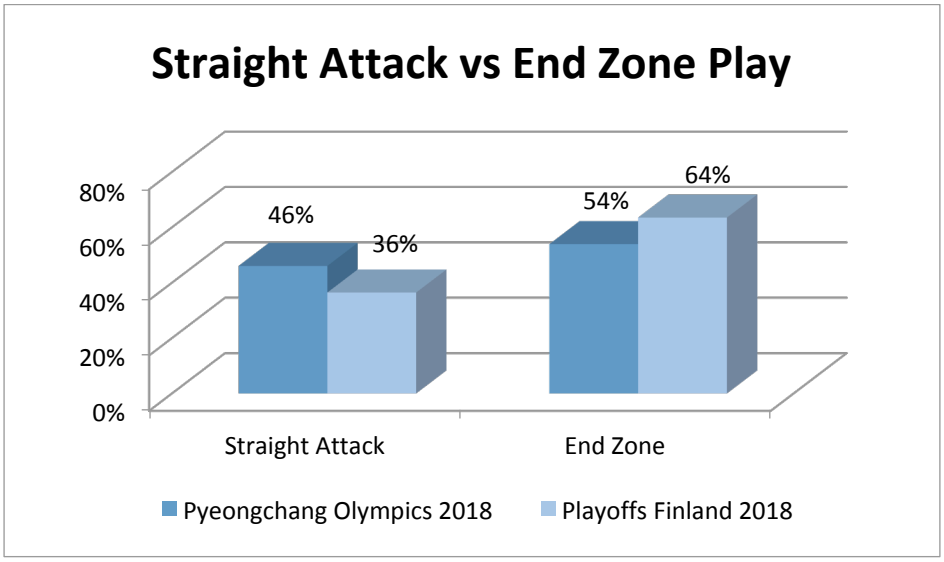


Figure 1. Straight Attack vs End Zone Play – Women's Ice Hockey PyeongChang Olympics vs. Finnish National League Play Offs 2018

Elomo and Poikonen found out that in SM League 2011/2012, rushes (straight attacks) counted almost 1/3 and offensive play (End Zone Play) 1/3 of the goals also. The remaining 1/3 came from turnovers. Based on this study it seems that in the women's game the amount of End Zone goals is stressed more, and even more in the Finnish playoffs (64 %) than in the Olympics (54 %). The results are not straightforward comparable because in this study the analysed goals were not separated into 5-on-5 play of power play, where many times the goal is scored in the end zone play.

Scoring Area

In the Olympics 43 % of all the goals were made in Area 1 and 36 % in Area 2. In the Finnish playoffs 41 % of the goals were made in Area 1 and 32 % in Area 2. In the Olympics 79 % of all the goals were made in areas 1 and 2, whereas in the Finnish playoffs 73% of the goals were made in these two areas (Figure 2). In the Olympics 17 % of the goals were made in Area 3 and only 4 % in Area 4. In the playoffs 21 % of the goals were made in Area 3 and 6 % in Area 4. If Area 3 is separated between blueline and the side areas, in the Olympics 10 % of the goals were made from the sides of Area 3 and 7 % from the blueline of area 3. In the playoffs 17 % of the goals were made from the sides of Area 3 and 4 % from the blueline of Area 3.

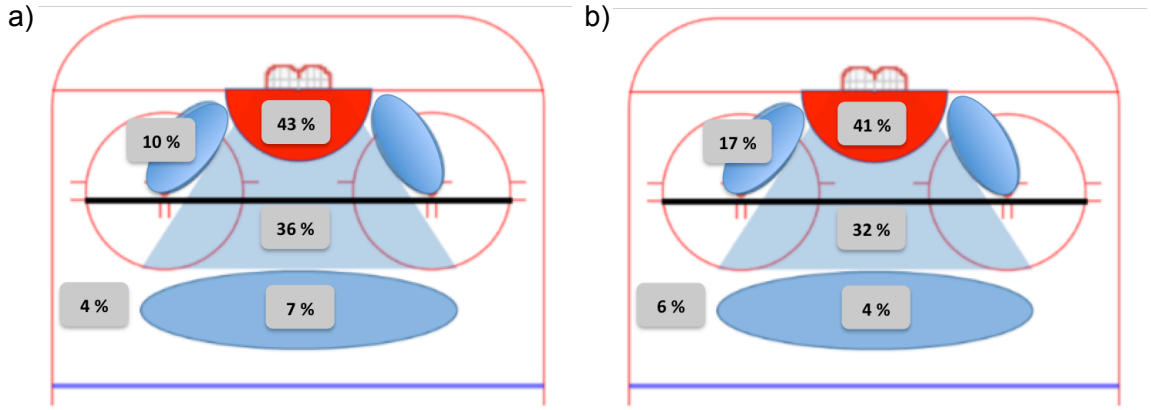


Figure 2. Goals by Scoring Area – Women's Ice Hockey. A) PyeongChang Olympics vs. B) Finnish National League Play Offs 2018

When looking at the areas where the World Ranking top two countries USA & Canada scored goals versus other countries in the Olympics it seems like the other countries scored slightly more goals from Area 1, but the North Americans scored clearly more goals from Area 2 (Other countries Area 1: 45 %, Area 2: 30 %. USA & CAN Area 1: 39 %, Area 2: 45 %).

Scoring area numbers are pretty much in line with the results from the men's side on areas 1 and 2. The biggest differentiating part in scoring areas is that in the women's game,

fewer goals are made from the blueline percentage wise. The percentage of goals from the blueline was at the U20 WC around 12 %, Olympics 2006 around 18 % and World Championships 2005 around 13 %. In the Pyeonchang women's tournament the number was 4 % and in the Finnish playoffs 7 %. As a peculiarity the North American teams scored no goals straight from the blueline in the Olympics.

Area of the net

Area of the net was one of the trickiest variables to be analysed in the Finnish playoffs. Due to poor video quality in some cases, many of the goals needed to be marked as "Other". In the Finnish playoffs 34 % of the shots were located in the Up Right and 19 % of the goals in the Up Left. Down Right and Down Left accounted 9-10 % of the goals both, and five hole 5 %. Most likely, the percentage of the lower parts of the goal would be higher if the "Other" category goals could be analysed better. The goals from the Olympics had slow motion and close ups so the data is more reliable. In the Olympics 29 % of the goals were scored in the Up Right corner and 21 % in the Up Left corner (Figure 3).

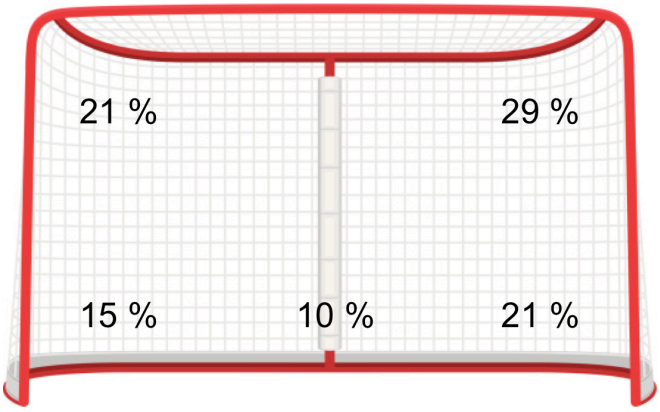


Figure 3. Goals by Area of the Net – Women's Ice Hockey PyeongChang Olympics 2018

In general most of the goals in one single area of the net were scored in the upper right corner. As a peculiarity, when looking at the locations where USA & Canada scored goals versus other countries in the Olympics, it is clear that the other countries scored fewer goals in the Up Left than in the Up Right, whereas the North American teams scored goals pretty much equal amount in both of the upper corners (Other countries Up Right 30 %, Up Left 16 %. USA & CAN Up Right 27 %, Up Left 30 %).

When the goals by area of the net were further analysed by scoring area in the Olympics the results show that in scoring Area 1, 42 % of the goals were made in upper parts of the goal and 45 % down. In scoring Area 2, 53 % of the goals were made in upper parts of the

goal and 34 % down. In scoring Area 3, 65 % of the goals were made in upper parts and 20 % down. In scoring Area 4, 50 % of the goals were made in upper parts, 25 % down and 25 % five hole.

Area of the net was the hardest part to analyse in this study, especially in the Finnish playoffs due to poor video quality and therefore only the results from the Olympics were further analysed. In the men's tournaments presented by Mensonen & Salo 58,4 % of the goals were scored low, whereas in the Pyeonchang tournament for women the percentage of goals scored low was 46 %.

Type of Shooting

In the Pyeonchang Olympics 53 % of all the goals made were made with a wrist shot (including the "snap shot") and in the Finnish play offs wrist shot was used in 60 % of the goals. Wrist shot counts over half of the shooting type in both of the cases and other type of shooting remains clearly lower. In the Olympics the other types of shooting percentage wise were: Slap shot 8 %, Rebound/Loose Puck 18 %, Deflect/Tip In 9 % and Back Hand 12 %. In the playoffs the percentages were: Slap shot 4 %, Rebound/Loose Puck 24 %, Tip in/Deflect 4 % and Back Hand 7 % (Figure 4).

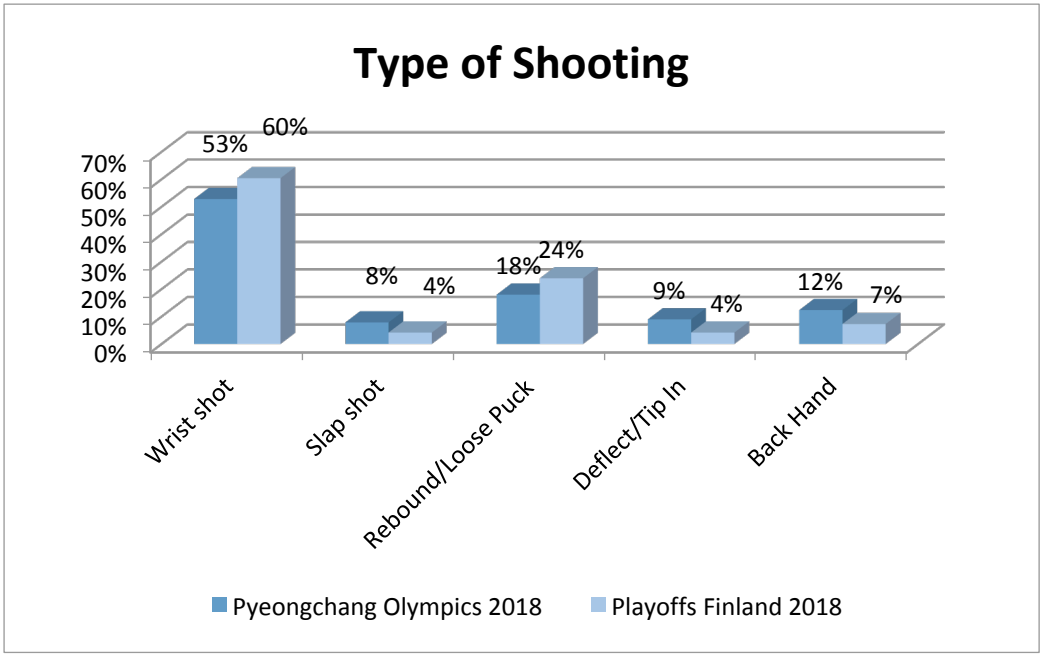


Figure 4. Type of Shooting – Women's Ice Hockey PyeongChang Olympics vs. Finnish National League Play Offs 2018

Type of shooting follows the results from the men's side, over 50 % of the goals are usually made with a wrist shot. Also the back hand numbers were similar. When comparing the

slap shot, the percentage on the men's Olympic tournament 2006 and WC 2005 was around 25 % whereas in the Women's Olympic tournament 2018 it was only 9 % and in the Finnish playoffs 5 %. It has to be noted though that there is over 12 years of time between the men's data and it might be that the role of the slap shot has come down also in the men's game since then as the quickness of the shot is emphasized more and more, despite the gender.

Type of Scoring

Type of Scoring has taken a look at the lateral movement and quick shooting in the scoring analyse. In the Olympics the Royal Road (Figure 5) was crossed (either by skating or passing) in 42 % of all the goals made. In the Finnish playoffs the Royal Road was crossed in 29 % of the goals. It is interesting that the other countries in the Olympics crossed the Royal Road in 46 % of the goals that they made, whereas the North Americans had the center line crossed in 33 % of the goals they scored in the Olympics.

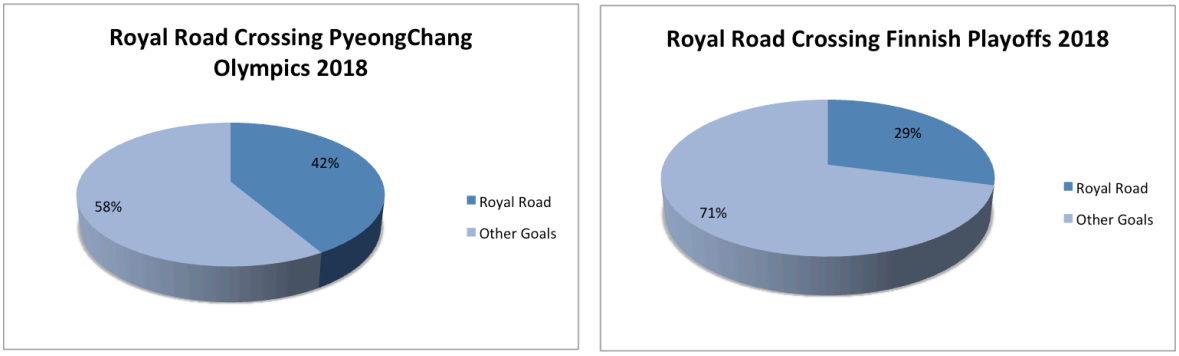


Figure 5. Royal Road Crossing % of all the goals – Women's Ice Hockey PyeongChang Olympics vs. Finnish National League Play Offs 2018

Lateral move or pass (Figure 6) was almost the same percentage wise in both the Olympics and in the playoffs. There was lateral move in 19 % of all the goals made in the Olympics and 21 % of the goals in the Playoffs. A lateral pass was part of goal scoring in around 1/3 of the goals in both the Olympics and in the Playoffs. On the men's side Valiquette stated that any pass that goes across the line below the tops of the circles that results in a shot on goal accounts for 22% of all goals. This study didn't make a difference where in the offensive zone the pass was made and so the Royal Road numbers might be bigger compared to men because of that.

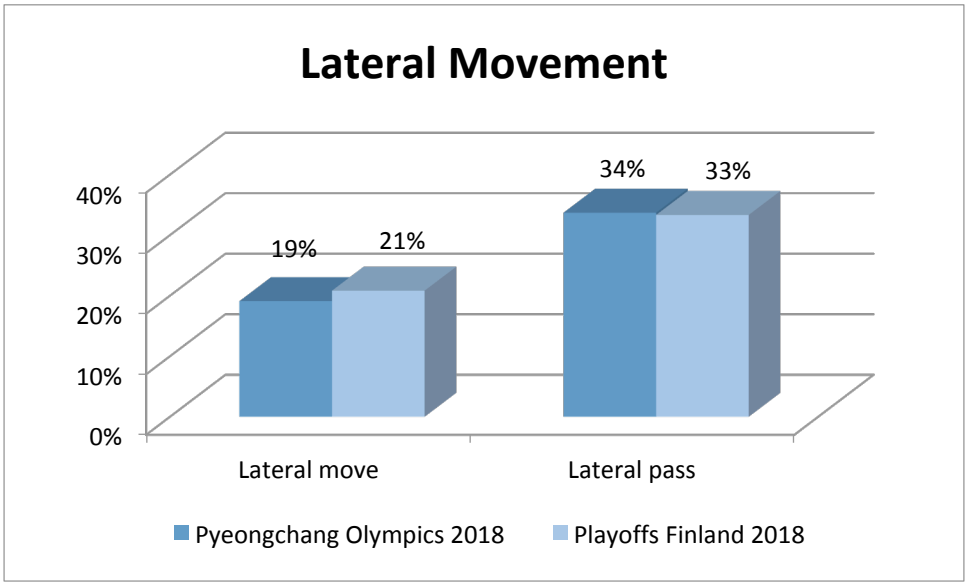


Figure 6. Lateral Movement (% of all the goals) – Women's Ice Hockey PyeongChang Olympics vs. Finnish National League Play Offs 2018

Another interesting finding is in the quickness of taking the shot (Figure 7). One-timer has been used clearly more in the Olympics to score goals (28 % of all the goals in the Olympics) than in the playoffs (19 % of all the goals in the Playoffs), whereas Quick Release has been used more in the playoffs (21 %) than in the Olympics (11 %).

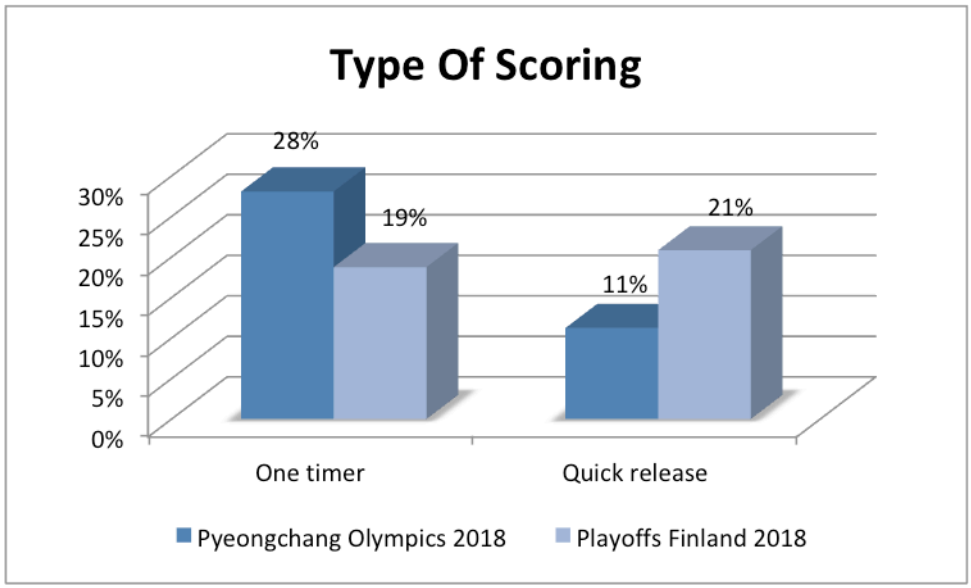


Figure 7. One-timer and Quick release – Women's Ice Hockey PyeongChang Olympics vs. Finnish National League Play Offs 2018

Also the amount of one-timers was higher (Olympics 28 % vs. Playoffs 19 %). On the other hand the amount of quick relase goals was higher in the Finnish playoffs (Olympics 11 % vs. Playoffs 21 %). In the study by Garbe analysing NHL teams he found out that the

teams in the NHL scored over 50 % of the goals by a one-timer and around 14 % of the goals with a quick relase. The quick release shots are in line with the men's NHL results, but even though the percentage of one-timers in the Olympics is higher than in the Finnish playoffs in women's ice hockey, there is a big difference with men's professional ice hockey (NHL results).

When the lateral pass and one-timer or quick release are analysed together, in all of the situations that there was a lateral pass before a goal was made, 63 % of the shots were one-timers in the Olympics and only 18 % in the Playoffs (Figure 8). There might be a big difference between men's top professional level and women's hockey, but also on the international level and national level inside women's hockey as well.

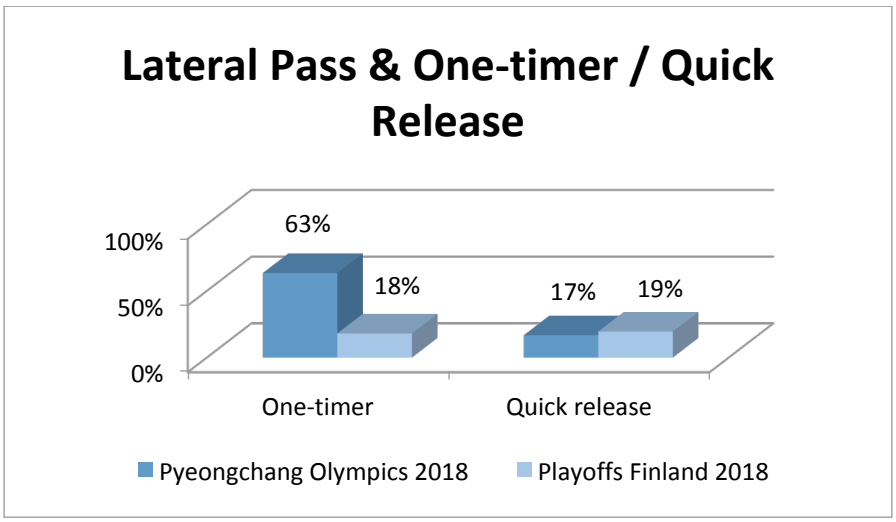


Figure 8. Lateral Pass & One-timer / Quick release – Women's Ice Hockey PyeongChang Olympics vs.Finnish National League Play Offs 2018

When analysing the lateral pass or move in more detail (Figure 9), it can be seen that most of the goals after the lateral movement in the Olympics were made in Area 1 (45 %). In the Finnish playoffs the biggest amount of goals after a lateral movement comes from Area 2 (42 %). One might assume that in the Olympics it would be harder to move/pass laterally closer to the goal, so in some ways the result is surprising.

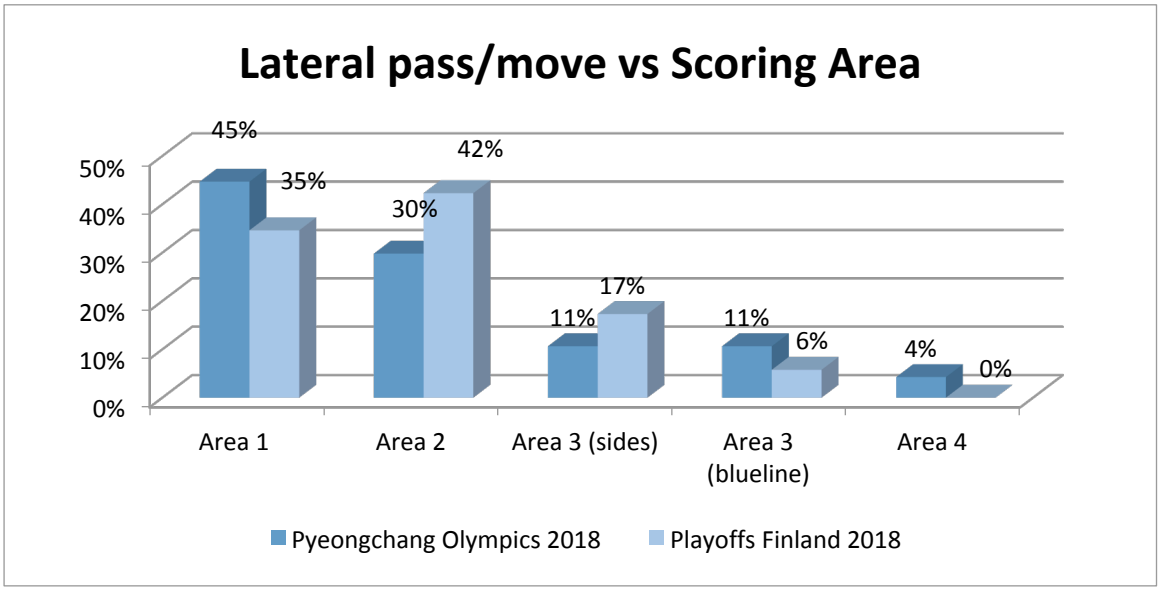
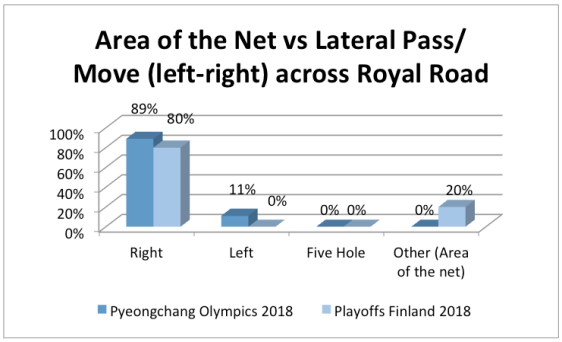


Figure 9. Goals scored after a lateral pass/move and the Scoring Area – Women's Ice Hockey PyeongChang Olympics vs. Finnish National League Play Offs 2018

When looking at the lateral pass or move across Royal Road and where the puck actually ended up in the net, it seems there is not much difference between the Olympics and the Finnish playoffs when the puck is moving from left to right (Figure 10). In the Olympics 89 % of the goals were scored on the right side of the net after the left-to-right move or pass and in 80 % in the Finnish playoffs. Interestingly, when the move is from right-to-left, the goal is scored more on the both sides of the net – In the Olympics 40 % of the goals were scored on the right side and 53 % on the left side, whereas in the playoffs the goal was scored on the right side 45 % and on the left side 30 %. The number of analysed goals in the study is not too big and by segmenting the data into smaller pieces (lateral passes/movement and areas) the data looses some of its reliability. Further studies are needed to back up especially these forementioned findings.



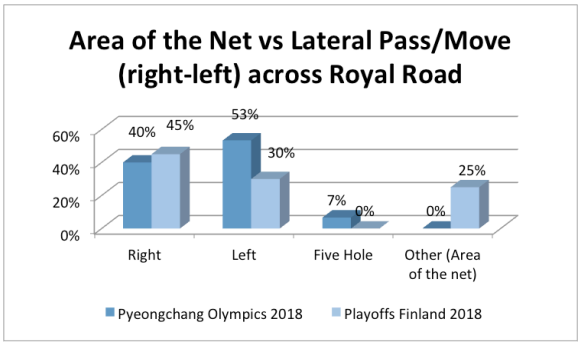


Figure 10. Area of the Net vs Lateral Pass/Move (left-right and right-left) across Royal Road – Women's Ice Hockey PyeongChang Olympics vs. Finnish National League Play Offs 2018

If the type of scoring is analysed depending whether it was a straight attack or end zone play (Figure 11), there are some differences between the Olympics and the Playoffs. In the Playoffs there are more Royal Road crossings (54 %) and lateral passes (43 %) in the straight attacks, whereas in the end zone play the Royal Road crossing drop to 15 % and the lateral pass to 28 %. In the Olympics the Royal Road is included in both the straight attack (41 %) and the end zone play (42 %) almost as many times percentually. In the Olympics though lateral move is highlighted in the straight attack (32 %) and lateral pass in the end zone play (44 %). Also one-timers plays a bigger role in the end zone play in the Olympics (35 %).

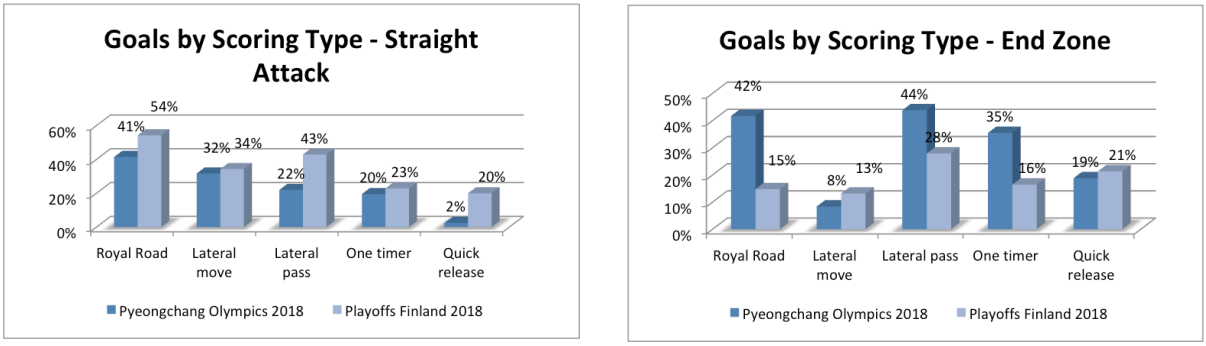


Figure 11. Type of Scoring by Straight Attack or End Zone Play (% of all the goals) – Women's Ice Hockey PyeongChang Olympics vs. Finnish National League Play Offs 2018

Type of scoring by straight attack vs end zone play is highlighting that in the Finnish playoffs Royal Road crossing, lateral move and lateral pass are part of the goal scoring especially in the straight attacks. In the Olympics on the other hand lateral passes and one-timers happen more often in the end zone play than in the straight attacks.

Supportive Actions

When looking at the supportive actions of goal scoring (Figure 11) there are some minor differences between the Olympics and the Finnish playoffs. There is a bigger percentage of goals made by Rebound or Loose Puck situation in the Finnish playoffs (24 % of the goals) than in the Olympics (18 %). On the other hand, more goals were made by Deflect in the Olympics (9 %) than in the Playoffs (4 %). Screen by the scoring team is made in 20 % of the Olympic goals and 24 % of the cases in the playoffs. It is interesting though, that in both the Olympics and in the playoffs, a defending player was making a screen more often than the scoring team (37 % of the goals in the Olympics and 34 % in the playoffs).

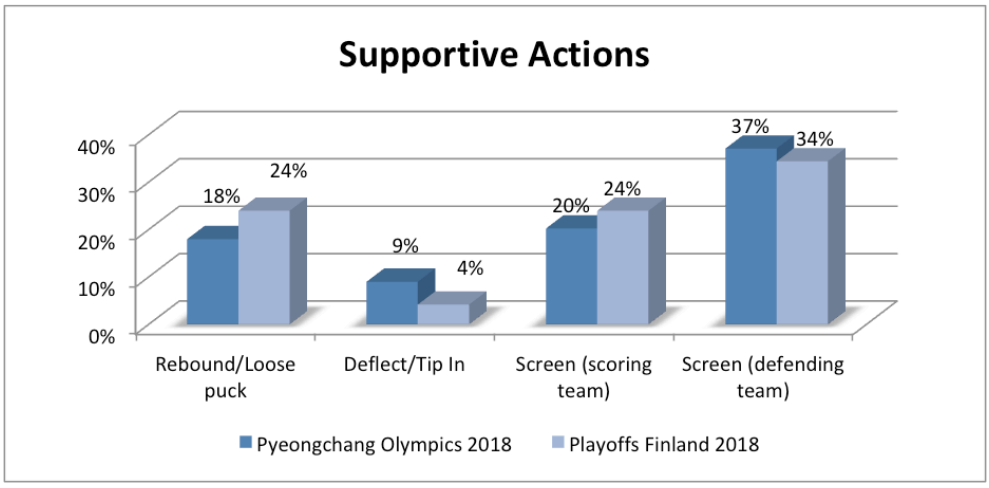


Figure 11. Supportive Actions in Goal Scoring – Women's Ice Hockey PyeongChang Olympics vs Finnish National League Play Offs 2018

Supportive actions are usually linked to the play on the blueline. In the Olympics only 6 of the goals were made from the blueline (Area 3 blueline) and only 4 in the Finnish Playoffs. As a peculiarity, the North American teams scored no goals from the blueline. 8 goals in the Olympics were made after an assisting shot from the blueline (e.g. deflect/tip in, rebound) and 9 goals in the Playoffs. If the goals and the assisting shots are counted together, "Blueline goals" count for 16 % of all the goals in the Olympics and 13 % of the goals in the Playoffs.

In the Olympics all of the goals made from the blueline was with a slap shot and all of them had screen (scoring or defending team). Four of them were made in the upper corners. Five of the goals from the blueline had a Royal Road crossing and 3 of the goals were made with a one-timer. In the Finnish playoffs one of the goals was made with a slap shot and all of the goals had screen (scoring or defending team), like in the Olympics. Three of the four goals were made in the upper corners. Only one of the goals had Royal Road crossing, but in three of the goals there was a lateral pass in question. One of the goals was made with a quick release.

In the Olympics in 7 out 8 of the assisting shots from the blueline resulting in a goal, there was screen by the defending team and 3 times by the scoring team. Five of the goals were made with a deflect/tip in and 3 by rebound. 4 of the goals after assisting shot was located in the upper corners. In the Playoffs, the 9 assisting shots had screen by the defending team 4 times and 5 times by the scoring team. Eight of the goals were rebound goals and only one was a deflect/tip in.

Rebound counted for 18 % of the goals in the Olympic tournament and 24 % in the Playoffs. Findings of Garbe show that around 20 % of the goals were rebounds for the NHL top and bottom ranked teams and also the SM League data supports that the rebound data is in line with the men's results. In the women's Olympic tournament in 2018 there was also more deflects / tip ins (9 %) than in the Playoffs (around 4 %). On the men's side the results varied between 2,4 % to around 6-7 % as well. For the screen play it is interesting to see how many times the screen was actually made by the defending team (Olympics 37 % and Playoffs 34 %). In 20 % of the Olympics goals the screen was made by the scoring team and 24 % of the times in the Playoffs.

6 Recommendations For Coaching On Goal Scoring

Having previous information about scoring as a player and a coach, and along with watching the women's games, working on the literature and especially after analysing the results in this study, many coaching ideas came to mind on how to improve scoring in women's ice hockey, or hockey in general. The summary of recommendations for coaching scoring in women's ice hockey reflecting on the literature and study results can be found in the following chapters.

Recommendation 1) Study scoring – Encourage the player to study scoring
In the FIHA recommendations it is advisable that the player should study scoring. I recommend that the coach should study scoring also and to mentor the player to study scoring – Discuss the different situations with the player and arouse intrest in learning. Also find out how the goalie is playing. The coach can also coach the goalie better when he/she knows the basic principles of how the goalie should be acting in different scoring situations. Many coaches coaching females have claimed that the women don't watch ice hockey enough even if they are playing themselves and therefore not understanding or learning about the game enough. This might contain a seed of truth and therefore the studying should be encouraged even more on the women's side. Use the coaching board, use the goalie to show the players how he/she moves and use videos.

Recommendation 2) Encourage the players to use the wrist shot / snap shot and practice focusing on power over accuracy
The wrist shot is, based on this study findings and results on the men's side, the most common way of shooting and scoring. It is a quick shot and can also be deceptive, as a (lateral) pass can be made from the same motion. Emphasize wrist shot over the slap shot. According to McMillan, power should be the primary focus, while accuracy should be secondary, the reason having to do with motor unit recruitment and synchronization. Therefore, a player should shoot their hardest right from the start, and try to be accurate as accurate as possible. Shooters should always aim at a target, but in the beginning the target might be quite large. One example of practising this way could be the summer training period where the players might practice shooting on their own time. During my playing career at least, I don't remember one single coach emphasizing the power when shooting was practised. When the power is reached the accuracy can be focused more on.

Recommendation 3) Plan drills that include taking the shot as quickly as possible

Men's ice hockey has been getting faster and faster and so is women's hockey too. There is less time and space in the game year after year. The Olympic hockey on the women's side is faster than the national level hockey just by looking at the game videos. It is not surprising then that the one-timer was used more to score goals in the Olympics than in the Finnish Playoffs, whereas quick-release goals were made more often on the national level. In the men's professional league the amount was even higher than in the women's game in the Olympics. The days when the ice practice started off with a nice 1-0 rotation excersice ending with taking a clean shot at the goalie are over, or should be. The best way to score is to shoot before the goalie gets ready. Quick release and one-timer are difficult techniques to master and therefore the ice practices should always include shooting this way. There are many ways of incorporating quick shooting in the practice, starting off with a stationary pass and shoot, advancing to end zone play or straight attack and including the shot type inside a small-area-game for example. If possible, summer training shooting on plywood should also be done more using one-timer or quick release. Also off ice games can be planned to support quicker release of shooting. According to study by McMillan, with players under 14 or 15, it is best to teach a "catch and release" and one-timer and can be introduced as the player reaches their mid to late teens.

Recommendation 4) Plan drills that include crossing the center line by moving or passing

Valiquette has observed that a puck crossing the Royal Road immediately preceding a shot increases a shooter's scoring opportunity by over 10 times, having to due with goalies forced to open up. The most effective way to create offence in the NHL is a pass across the Royal Road. Findings in this study seem to be backing up this information as a very big part, 42 % of the goals, had Royal Road crossing in the Olympics, and also in the Finnish playoffs the number was high (29 %). Also the percentage of goals including a lateral pass was higher than just moving laterally. In the Olympics the lateral pass was emphasized especially in the end zone play. The coach should again stress the players that the likelyhood of scoring increases with lateral movement. On the other hand, the coach should take the age group into concideration, sometimes too much information is too much information. Simplified, how easy it is for the beginners to set up at least a cone on the ice that the players have to go around, crossing the center line. When playing against the defence there could be a fake and an attempt to break into the middle. Vise versa, the coach can and should also coach the defence to block the middle. For the older players the emphasis might be more on the lateral pass, how to fake the pass as the puck carrier, keeping up the threat of shooting and still giving a quality pass. Or when to choose the shot or the pass. For the non-puck-carrier to offer the passing opportunity behind the

center line, being ready to shoot as quickly as possible and going for rebounds. Again, off ice games can be used also to learn lateral movement.

Recommendation 5) Coach the player to aim the shot depending on the scoring area and the situation

According to this study around 50 % of the goals were scored in the upper parts of the goal whereas the men's results were somewhat lower for the upper parts. It can be a natural reason of female goalies being smaller, but also many of the scoring recommendations encourage shooting up based on goalie movement or screen for example. It is a cliche to say in Finnish "läheltä ylös" (aim up high close to the crease), but it seems to be true based on data and recommendations. In this study 42 % of the goals in the Olympics were scored high of all the goals made in Area 1, but the study doesn't reveal the missed scoring chances due to low shots that could've resulted in a goal when aimed high. In the Olympics there was also lateral pass included in 45 % of the goals made in Area 1 which is surprisingly big number and suggest that being able to give lateral pass closer to the goal mouth increases opportunity to score in the women's international level.

In Area 2, 53 % of the goals, were made in upper parts of the goal in this study. The scoring recommendations suggest that it's good to force the goalie to move laterally either by skating or passing. If the pass is crossing the Royal Road the likelihood to score on the same side upper corner is better. If the center line is not crossed the shot should be taken against the movement of the goalie. The best scoring opportunity might be up on the glove side. Some recommendations suggest that another place to shoot is low/semi-low on the blocker side, some suggest that the low/semi-low shot should be taken on the glove side.

In the area 3 (blueline) the recommendations where to aim the shot vary too. For scoring aiming the shot high might be the thing to do, if there is screen and the goalie has to look for the puck leaving upper corners open. For assisting in goal scoring a quick low shot might be the right choice to cause rebounds or opportunity to deflect the puck in.

In the Area 3 (sides) scoring depends on whether it's a straight attack or an end zone play. In the straight attack on Area 3 and 4 it is recommended to try to make the goalie move sideways and shoot agains the goalie movement. Scoring recommendations suggest that a low to semi-low shot is difficult for the goalkeeper to stop. On the other hand if it's an end zone play or a power play situation and the puck is passed across the center line, the best scoring opportunity in Area 3 (sides) opens up in the same side of the shooter and usually in the upper corner. The findings of this study seem to be backing up that

information at least on the other side. Over 80 % or more goals were scored in both the Olympics and in the Playoffs to the right side of the net after a pass from left to right.

As a coach, plan drills diversely to support learning and so that goal scoring happens in different kind of situations – Based on the scoring area, if it's a straight attack or end zone play, whether there's a passing opportunity or possibility for lateral movement.

Recommendation 6) Emphasize supportive actions in scoring from the blueline

One of the most striking results in the study was the low number of goals from the blueline compared to men's ice hockey. The reasons can be speculated: Lack of power or accuracy in the shot, lack of lateral move or lateral passing, lack of quick shooting? Lack of supportive actions? Another coach might draw conclusions and not even build the scoring chance around blueline play – A coincidence or not that the North American teams scored no goals from the blueline in the Olympics. Another way of approaching the matter is emphasizing the importance of supportive actions. Even the number of goals scored (or assisting shots) from the blueline in this study is low, it seems that these goals all include supportive actions. For the screen play the recommendations suggest that when working on goal mouth scoring it is important that all drills start with the player trying to get directly in front of the goalie in order to screen. Vise versa the coach can at the same time coach the defensive players on box out. According to the study findings many times the screen was actually made by the defensive team. If the blocking of the shots and box out is working, the numbers might go down. In the supportive actions the quality of the shot coming from the blueline plays also an important part – The shooter has to get the shot by the shot blocker, to get the puck to the goal mouth area either with a direct shot or indirectly and the shot doesn't even have to be the hardest one.

Recommendation 7) Be ready for changes and study more

Just as one might assume to know everything about goal scoring, the game gets faster, the players get faster, the equipment changes, and there will be a change of rules in the game or something else that affects the scoring. The player is also an individual and there is no stereotype of a great goal scorer as was learned in the theoretical part, the best goal scorer can score goals from the slot, or on power-play, or by being master of deflecting the shots.

7 Discussion

The key conclusion is that many of the scoring recommendations being analysed in this study seem to support goal scoring in women's hockey. Also many of the results seem to be in line with the men's results, even though there are some differences too. The key outcome of this study was a list of scoring recommendations for women's ice hockey. As a hypothesis the Olympic ice hockey for women was supposed to be higher level than the national level women's ice hockey. The results show maybe more similarities than differences, except when comparing the amount of one-timers and quick-release shots. There were no big surprises in the results of the study, but still, some of the outcomes were an eye opener in a way. For example the small amount of goals made from the blueline was striking, the rather big percentage of goals that included crossing the center line, as well as the difference between one-timers in goal scoring in women's ice hockey compared to men's ice hockey. An easy argument behind the reasons is the player skill level, but the question also remains how much emphasis has been put on coaching with these recommendations on the international and national level?

In addition to the study results it was interesting to find out that most likely many of the teams in the Finnish National League are not using any video analysing software to analyse their game videos. During the past season there has been more goal highlights from the National League and the games have been able to see from Ruutu+ pay TV. Perhaps in the near future this kind of study is easier to conduct when the goals are available more easily.

When looking at the validity of this study the defect of this study is most definitelly the number of analysed goals. Is the amount of goals enough to draw conclusions about scoring in women's hockey in general? The theoretical framework and the selection of the variables were based on the FIHA focus areas in goal scoring but it leaves most likely some other scoring recommendations neclected. Also the results would be more interesting if all the scoring chances were recorded – How many times scoring *doesn't* actually happen because the recommendations might not be met? Question about reliability is that even the analysed variables were categorised well it was sometimes difficult to decide which category to choose, so there is definitely room for some error. The study compares the results with the data from the men's side and it can be argued is it reasonable to compare men's long-established professional league with the numbers of rather young and generally amateur hockey. Also the validity of the data from the men's side might be questionable as also the men's game is changing all the time.

This thesis is just a scratch on the surface and there is definitelly need for futher studies on goal scoring in women's hockey. It would be interesting to find out about scoring e.g. in the NWHL or how the scoring differs with the top two ranked countries in the world, USA and Canada, and the rest of the countries in more detail. Also it would be nice to learn more about scoring chances versus goals and game situations affecting the scoring. Even though the sample in this study is small, I think and hope that this study has it's place in the study of women's ice hockey, or can at least act as an door opener for future studies.

Working with this thesis topic was in some parts very familiar to me, as I've been playing for over 20 years of ice hockey on the national level of Finland and Swizerland and on the international level for over 200 games in the Finnish National Team. My long history as a player and some history as a coach helped in understanding and internalising the different themes in the study, no doubt. I still feel I definitelly learned a lot during the thesis process as in some areas I find I haven't been coached, or explained why, based on these kind of scoring recommendations. I was also playing as defence most of my career and feel like scoring has not been my strongest area of the game – Another reason also why choosing this topic to learn more as a coach. The thesis process was one of the most challenging tasks that I have ever had because I started working with the study while I was pregnant and finalised the work while the baby was born. Organisation skills and some sleepless nights were needed. I would not start working with another thesis though in a similar kind of life situation. The initial thought and goal was to make a wider study, but because of other priorities in personal life the study was narrowed down. As a person with tendences of perfectionism working with this study showed that sometimes half-good is good-enough. Discussions based on the study with other coaches have been very enjoyable and educational. The recommendations on goal scoring and working with the theoretical framework gave lots of new ideas for me in coaching and will propably change some of my coaching habits for good.

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Appendices

Appendix 1. Goals Olympics

				SA/EZ		AREA					TYPE OF SHOOTING					SUPPORTIVE ACTIONS					TYPE OF SCORING							AREA OF THE NET					
Date	Group	Goal #	Team	Straight Attack	End Zone	Area 1	Area 2	Area 3 (sides)	Area 3 (blueline)	Area 4	Wrist shot	Slap shot	Rebound/Loose Puck	Deflect/Tip In	Back Hand	Shot from Area 3 (blueline)	Rebound/Loose puck	Deflect/Tip In	Screen (scoring team)	Screen (defending team)	Royal Road	Lateral move (Left-Right)	Lateral move (right-left)	Lateral pass (left-right)	Lateral pass (right-left)	One timer	Quick release	Up Right	Up Left	Down Right	Down Left	Five Hole	Other (Area of the net)
10.2.2018	Group B	Goal 1	SWE		1			1			1															1	1					
10.2.2018	Group B	Goal 2	JPN		1	1							1				1												1			
10.2.2018	Group B	Goal 3	SWE		1	1					1														1			1				
10.2.2018	Group B	Goal 1	SUI	1			1				1											1							1			
10.2.2018	Group B	Goal 2	SUI	1			1				1										1				1					1		
10.2.2018	Group B	Goal 3	SUI		1	1					1										1			1					1			
10.2.2018	Group B	Goal 4	SUI		1		1						1				1		1	1						1			1			
10.2.2018	Group B	Goal 5	SUI	1			1				1										1			1		1		1				
10.2.2018	Group B	Goal 6	SUI		1			1					1				1				1					1			1			
10.2.2018	Group B	Goal 7	SUI		1				1			1							1	1	1				1	1		1				
10.2.2018	Group B	Goal 8	SUI	1		1					1										1	1							1			
11.2.2018	Group A	Goal 1	FIN	1			1				1									1						1			1			
11.2.2018	Group A	Goal 2	USA		1	1							1				1					1						1				
11.2.2018	Group A	Goal 3	USA	1			1				1										1			1		1		1				
11.2.2018	Group A	Goal 1	CAN		1		1				1															1			1			
11.2.2018	Group A	Goal 2	CAN		1		1							1		1		1		1							1		1			
11.2.2018	Group A	Goal 3	CAN	1		1									1						1			1		1		1				
11.2.2018	Group A	Goal 4	CAN		1			1			1									1	1			1			1	1					
11.2.2018	Group A	Goal 5	CAN		1	1							1				1													1		
12.2.1018	Group B	Goal 1	SUI		1					1	1									1								1				
12.2.1018	Group B	Goal 2	SUI	1			1				1																		1			
12.2.1018	Group B	Goal 3	SUI	1			1				1												1							1		
12.2.1018	Group B	Goal 4	JPN		1	1								1		1		1	1	1	1			1					1			
13.2.2018	Group A	Goal 1	CAN	1		1					1										1			1	1				1			
13.2.2018	Group A	Goal 2	CAN	1		1									1						1	1					1					
13.2.2018	Group A	Goal 3	CAN		1		1				1								1	1										1		
13.2.2018	Group A	Goal 4	CAN	1			1				1																			1		
13.2.2018	Group A	Goal 5	FIN		1	1							1				1													1		
13.2.2018	Group A	Goal 1	USA	1						1	1								1	1	1			1						1		
13.2.2018	Group A	Goal 2	USA	1		1							1				1													1		
13.2.2018	Group A	Goal 3	USA	1		1									1								1					1				
13.2.2018	Group A	Goal 4	USA	1		1							1			1	1												1			
13.2.2018	Group A	Goal 5	USA	1		1									1						1		1					1				
14.2.2018	Group B	Goal 1	SUI		1			1			1													1		1		1				
14.2.2018	Group B	Goal 2	SWE		1	1								1		1		1		1					1			1				
14.2.2018	Group B	Goal 3	SUI		1	1								1				1	1	1	1			1					1			
14.2.2018	Group B	Goal 1	JPN		1	1					1									1					1			1				
14.2.2018	Group B	Goal 2	JPN		1	1							1			1	1			1									1			
14.2.2018	Group B	Goal 3	COR	1			1				1									1											1		
14.2.2018	Group B	Goal 4	JPN		1				1			1							1	1	1				1		1			1			
15.2.2018	Group A	Goal 1	CAN		1		1				1									1	1			1		1		1				
15.2.2018	Group A	Goal 2	CAN	1						1	1									1									1			
15.2.2018	Group A	Goal 3	USA	1			1				1																				1	
15.2.2018	Group A	Goal 1	FIN		1				1			1							1	1	1			1		1		1				

15.2.2018	Group A	Goal 2	FIN		1	1					1									1			1		1				1			
15.2.2018	Group A	Goal 3	FIN		1	1									1					1		1					1					
15.2.2018	Group A	Goal 4	OAR		1			1			1													1					1			
15.2.2018	Group A	Goal 5	FIN		1				1			1							1	1				1	1			1				
15.2.2018	Group A	Goal 6	FIN	1			1								1					1	1					1						
17.2.2018	QF	Goal 1	OAR	1				1			1									1		1					1					
17.2.2018	QF	Goal 2	SUI	1		1									1					1	1						1					
17.2.2018	QF	Goal 3	SUI	1			1				1								1	1	1						1					
17.2.2018	QF	Goal 4	OAR	1		1							1				1													1		
17.2.2018	QF	Goal 5	OAR		1					1	1								1	1	1				1						1	
17.2.2018	QF	Goal 6	OAR		1	1					1												1		1				1			
17.2.2018	QF	Goal 7	OAR		1	1					1									1				1	1			1				
17.2.2018	QF	Goal 1	FIN	1		1									1						1								1			
17.2.2018	QF	Goal 3	FIN		1		1				1								1			1								1		
17.2.2018	QF	Goal 4	FIN		1				1			1							1	1		1								1		
17.2.2018	QF	Goal 5	SWE	1				1			1																			1		
17.2.2018	QF	Goal 6	FIN	1		1							1				1															1
17.2.2018	QF	Goal 7	SWE	1			1				1																1					
17.2.2018	QF	Goal 8	FIN	1			1						1				1			1									1			
17.2.2018	QF	Goal 9	FIN	1		1					1													1		1				1		
18.2.2018	C5-8	Goal 1	SUI		1		1				1										1				1	1		1				
18.2.2018	C5-8	Goal 2	SUI	1			1						1				1		1	1	1								1			
18.2.2018	C5-8	Goal 1	JPN		1	1							1			1	1			1										1		
18.2.2018	C5-8	Goal 2	SWE	1		1					1																1					
18.2.2018	C5-8	Goal 3	JPN		1				1			1								1	1					1	1					
19.2.2018	SF	Goal 1	USA		1						1										1							1				
19.2.2018	SF	Goal 2	USA		1		1				1																		1			
19.2.2018	SF	Goal 3	USA		1			1				1							1		1				1	1			1			
19.2.2018	SF	Goal 4	USA		1		1							1		1		1	1	1										1		
19.2.2018	SF	Goal 5	USA		1		1				1										1			1			1	1				
19.2.2018	SF	Goal 1	CAN		1	1					1															1		1				
19.2.2018	SF	Goal 2	CAN		1		1								1				1	1					1		1	1				
19.2.2018	SF	Goal 3	CAN		1			1			1																				1	
19.2.2018	SF	Goal 4	CAN	1		1							1				1		1													1
19.2.2018	SF	Goal 5	CAN		1		1						1				1												1			
20.2.2018	C5-6	Goal 1	SUI	1			1				1																				1	
21.2.2018	Bronze	Goal 1	FIN		1	1								1		1		1	1	1							1					
21.2.2018	Bronze	Goal 2	FIN	1		1					1										1			1	1			1				
21.2.2018	Bronze	Goal 3	OAR		1		1				1									1	1				1	1						
21.2.2018	Bronze	Goal 4	FIN	1		1									1						1	1					1			1		

21.2.2018	Bronze	Goal 5	OAR	1		1									1					1	1								1			
22.2.2018	Gold	Goal 1	USA		1	1								1				1	1	1										1		
22.2.2018	Gold	Goal 2	CAN	1		1								1				1											1			
22.2.2018	Gold	Goal 3	CAN	1			1				1									1				1		1			1			
22.2.2018	Gold	Goal 4	USA	1			1				1																1					
				Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
				41	48	38	32	9	6	4	47	7	16	8	11	8	16	8	18	33	37	9	8	15	15	25	10	26	19	19	13	9	3	
				46%	54%	43%	36%	10%	7%	4%	53%	8%	18%	9%	12%	9%	18%	9%	20%	37%	42%	10%	9%	17%	17%	28%	11%	29%	21%	21%	15%	10%	3%	
					Total # of goals:	89	100%																											

Appendix 2. Goals Playoffs

				SA/EZ		AREA					TYPE OF SHOOTING					SUPPORTIVE ACTIONS					TYPE OF SCORING							AREA OF THE NET					
Date	Group	Goal #	Team	Straight Attack	End Zone	Area 1	Area 2	Area 3 (sides)	Area 3 (blueline)	Area 4	Wrist shot	Slap shot	Rebound/Loose puck	Tip In/Deflect	Back Hand	Shot from Area 3 (blueline)	Rebound/Loose puck	Deflect	Screen (scoring team)	Screen (defending team)	Royal Road	Lateral move (left-Right)	Lateral move (right-left)	Lateral pass (left-right)	Lateral pass (right-left)	One timer	Quick release	Up Right	Up Left	Down Right	Down Left	Five Hole	Other (Area of the net)
6.3.2018	Play offs	Goal 1	KalPa	1			1				1										1				1		1		1				
6.3.2018	Play offs	Goal 2	Blues		1			1					1			1	1		1										1				
6.3.2018	Play offs	Goal 3	Blues		1			1					1				1		1									1					
6.3.2018	Play offs	Goal 4	Blues	1		1							1				1																1
6.3.2018	Play offs	Goal 5	Blues		1	1								1				1							1						1		
6.3.2018	Play offs	Goal 6	Blues		1		1						1				1			1									1				
6.3.2018	Play offs	Goal 7	Blues		1	1					1										1			1		1							1
6.3.2018	Play offs	Goal 2	HPK	1		1					1										1			1		1		1					
6.3.2018	Play offs	Goal 3	Kuortane		1			1					1				1											1					
6.3.2018	Play offs	Goal 4	Kuortane		1	1							1				1														1		
6.3.2018	Play offs	Goal 5	Kuortane		1	1					1															1						1	
8.3.2018	Play offs	Goal 1	KalPa		1					1	1								1	1									1				
8.3.2018	Play offs	Goal 2	KalPa		1			1			1									1				1				1					
8.3.2018	Play offs	Goal 3	Blues		1	1							1				1														1		
8.3.2018	Play offs	Goal 4	Kalpa	1		1									1						1	1						1					
8.3.2018	Play offs	Goal 1	Kuortane	1		1									1							1										1	
8.3.2018	Play offs	Goal 2	Kuortane	1			1				1										1				1	1			1				
8.3.2018	Play offs	Goal 3	Kuortane		1					1	1								1	1													1
10.3.2018	Play offs	Goal 1	Blues		1		1				1																1						1
10.3.2018	Play offs	Goal 2	Blues		1	1							1				1											1					
10.3.2018	Play offs	Goal 3	Blues	1		1									1						1	1						1					
10.3.2018	Play offs	Goal 4	Blues	1		1					1													1		1		1					
10.3.2018	Play offs	Goal 5	Blues		1	1									1															1			
10.3.2018	Play offs	Goal 6	Blues	1		1					1										1				1								1
10.3.2018	Play offs	Goal 7	Blues		1	1					1										1				1	1		1					
10.3.2018	Play offs	Goal 1	Kuortane		1	1									1							1							1				
10.3.2018	Play offs	Goal 2	HPK		1			1			1												1					1					
10.3.2018	Play offs	Goal 3	Kuortane		1					1		1							1	1						1		1					
10.3.2018	Play offs	Goal 4	Kuortane		1	1							1				1															1	
11.3.2018	Play offs	Goal 1	Blues		1		1				1								1	1			1						1				
11.3.2018	Play offs	Goal 2	Blues		1			1			1															1			1				
17.3.2018	Play offs	Goal 1	Kärpät		1			1			1								1	1			1					1					
17.3.2018	Play offs	Goal 2	Blues	1	1								1				1			1													
17.3.2018	Play offs	Goal 3	Blues		1		1						1				1			1		1					1		1		1		
17.3.2018	Play offs	Goal 4	Kärpät		1			1			1												1					1					
17.3.2018	Play offs	Goal 5	Kärpät		1		1				1								1						1			1					
17.3.2018	Play offs	Goal 1	Kuortane	1		1					1										1		1						1				
17.3.2018	Play offs	Goal 2	Ilves		1			1			1										1			1		1		1					
18.3.2018	Play offs	Goal 1	Blues		1			1			1										1			1		1		1					
18.3.2018	Play offs	Goal 2	Blues		1				1				1				1			1													1
18.3.2018	Play offs	Goal 3	Blues		1		1				1																	1					
18.3.2018	Play offs	Goal 4	Kärpät		1	1							1			1	1																1
18.3.2018	Play offs	Goal 2	Kuortane	1			1				1										1				1		1		1				
18.3.2018	Play offs	Goal 3	Ilves	1				1				1							1	1	1		1					1					
18.3.2018	Play offs	Goal 4	Kuortane	1			1				1																						1
18.3.2018	Play offs	Goal 5	Ilves	1			1				1																	1					
18.3.2018	Play offs	Goal 6	Kuortane	1			1				1								1				1					1					
18.3.2018	Play offs	Goal 7	Ilves		1	1							1			1	1																1
18.3.2018	Play offs	Goal 8	Kuortane	1			1				1																	1					
18.3.2018	Play offs	Goal 9	Kuortane	1		1							1				1																1
22.3.2018	Play offs	Goal 1	Blues	1			1				1									1	1		1							1			
22.3.2018	Play offs	Goal 2	Kärpät		1		1				1										1				1	1			1				
22.3.2018	Play offs	Goal 3	Kärpät	1			1								1								1				1						
22.3.2018	Play offs	Goal 4	Kärpät		1	1								1				1													1		
22.3.2018	Play offs	Goal 5	Kärpät	1			1				1										1		1		1		1						
22.3.2018	Play offs	Goal 6	Blues		1	1								1		1		1	1	1								1					
22.3.2018	Play offs	Goal 2	Ilves	1				1			1																						1
22.3.2018	Play offs	Goal 3	Ilves		1	1					1															1							1
22.3.2018	Play offs	Goal 4	Kuortane		1			1					1			1	1													1			
22.3.2018	Play offs	Goal 5	Kuortane	1		1					1										1			1	1				1				
22.3.2018	Play offs	Goal 6	Kuortane		1			1					1				1																1
24.3.2018	Play offs	Goal 1	Ilves	1		1					1																				1		
24.3.2018	Play offs	Goal 2	Kuortane	1			1				1									1	1				1		1						1
24.3.2018	Play offs	Goal 3	Ilves	1				1			1													1			1				1		
24.3.2018	Play offs	Goal 4	Kuortane		1				1		1								1	1				1				1					
24.3.2018	Play offs	Goal 5	Ilves		1	1					1								1	1	1			1	1					1			
24.3.2018	Play offs	Goal 1	Kärpät		1	1							1			1	1														1		
24.3.2018	Play offs	Goal 2	Blues	1			1				1								1	1								1					
24.3.2018	Play offs	Goal 3	Kärpät		1		1				1										1		1		1		1						1
24.3.2018	Play offs	Goal 4	Blues		1	1							1			1	1		1	1													1
24.3.2018	Play offs	Goal 5	Blues		1	1							1			1	1		1	1													1
24.3.2018	Play offs	Goal 6	Blues		1					1		1								1													1
24.3.2018	Play offs	Goal 7	Kärpät		1				1			1							1	1	1			1		1		1					
25.3.2018	Play offs	Goal 1	Blues	1				1			1												1					1					
25.3.2018	Play offs	Goal 2	Kärpät		1		1				1								1	1				1		1			1				
25.3.2018	Play offs	Goal 3	Kärpät		1				1		1									1					1				1				
25.3.2018	Play offs	Goal 4	Blues		1		1				1									1						1				1			
30.3.2018	Play offs	Goal 1	Kärpät		1				1		1								1	1				1					1				
30.3.2018	Play offs	Goal 2	Kärpät	1		1									1						1	1						1					
30.3.2018	Play offs	Goal 3	Ilves		1					1	1								1	1						1	1	1					
31.3.2018	Play offs	Goal 1	Kuortane	1		1					1										1		1	1			1						1
31.3.2018	Play offs	Goal 2	Kuortane	1			1				1								1									1					
31.3.2018	Play offs	Goal 3	Kuortane	1			1				1										1			1		1							1
31.3.2018	Play offs	Goal 4	Kuortane		1		1				1								1					1		1				1			
1.4.2018	Play offs	Goal 1	Ilves		1	1							1				1											1					
1.4.2018	Play offs	Goal 2	Kärpät		1	1							1			1	1		1	1										1			
7.4.2018	Play offs	Goal 1	Ilves	1			1				1								1			1						1					
7.4.2018	Play offs	Goal 2	Ilves	1			1				1								1	1	1			1		1	1						
7.4.2018	Play offs	Goal 3	Kärpät		1	1								1				1	1										1				
7.4.2018	Play offs	Goal 4	Kärpät		1	1					1										1			1	1					1			
8.4.2018	Play offs	Goal 1	Kärpät		1		1				1								1				1		1		1						
8.4.2018	Play offs	Goal 2	Kärpät		1	1							1				1													1			
8.4.2018	Play offs	Goal 3	Ilves	1		1					1										1		1		1	1		1					
8.4.2018	Play offs	Goal 4	Kärpät		1		1				1								1					1		1			1				
8.4.2018	Play offs	Goal 5	Kärpät		1		1				1														1								1
8.4.2018	Play offs	Goal 6	Kärpät	1			1				1										1			1		1		1					
						Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
				35	61	39	31	16	4	6	58	4	23	4	7	9	23	4	23	33	28	7	13	13	19	18	20	33	18	9	10	5	21
				36%	64%	41%	32%	17%	4%	6%	60%	4%	24%	4%	7%	9%	24%	4%	24%	34%	29%	7%	14%	14%	20%	19%	21%	34%	19%	9%	10%	5%	22%
			Total # of goals:			96		100%																									