

Creating a Goaltending Development Manual for Belgium Ice Hockey

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<p>The objective of the thesis and was to create a goalie development manual for the Royal Belgian Ice Hockey Federation (RBIHF). The manual will provide goalies and coaches a guide for developing players in the position. The manual aims to provide a technical resources for goalies and coaches on the skills that goalies need to focus on to allow them to improve their play.</p> <p>“The backbone of a hockey team”or “The most important position in sports” are two of many phrases that is used to describe the position of the goalkeeper in the sport of Ice Hockey. Judging by those two description, one can easily gain a sense of the importance and value of the player charged to tend the hockey goal. Ironically, it is one of the most neglected position when it comes to development and coaching of goalies in practices</p> <p>The manual gives advice and guidelines on how certain skills are executed and why they are used in goaltending today. It points out areas in technical, tactical, mental and physical development of the goalie.</p> <p>The manual is also making use of current advances in technology by using the iPad as the main platform. It allows the user to download the content online then use it of-fline. Points are given within the manual and accompanied by videos and pictures to help the individual understand the content better.</p>	
<p>Keywords Ice Hockey, Goaltending, Education, Coaching</p>	

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Introduction

Belgium is a nation of 10,444,268 people est. (CIA, 2014) The Royal Belgian Ice Hockey (RBIHF) is the governing body for Ice Hockey in Belgium. As a founding member of the International Ice Hockey Federation (IIHF), it has existed since 1912. There are 18 ice rinks and 15 hockey clubs and 1157 registered players. (IIHF, 2009). During the 2012-13 hockey season, the RBIHF sent four teams to participate in the IIHF World Championships program. Men's Under 18's (U18), Under 20's (U20), Women's national teams all participated in Division 2B. While the Men's national team played in Division 2A.

In the literature, the word "Goalie" or "Goalkeeper" will compass the meaning of the following terms; 'Goaltender', "Net minder", "Tender", etc. The author also recognizes the use of this manual by goalies of both genders but will use "He" as a way to address the player regardless of gender.

"The backbone of a hockey team" or "The most important position in sports" are two of many phrases that is used to describe the position of the goalkeeper in the sport of Ice Hockey. Judging by those two description, one can easily gain a sense of the importance and value of the player charged to tend the hockey goal. Ironically, it is one of the most neglected position when it comes to development and coaching of goalies in practices.

The purpose of this manual is to provide a goalie development information as well as a model for goalies and goalie coaches alike to follow. The manual will try to fill avoid that is missing in the hockey development program of the Royal Belgian Ice Hockey Federation.

The IIHF has included a goalie development program in its education program for the last few years. The goalie coaches education program at the IIHF Development Camp was introduced in 2011. A goalie manual was published a few years earlier.

During 2012-2013 hockey season, I started my work placement with the Royal Belgian Ice Hockey Federation (RBIHF) in Antwerp, Belgium. One of my main duties was

working in the hockey development which included working with the U18 as well as the men's and women's national teams. I was also given the opportunity to plan and run practices with a local club, the Leuven Chiefs. As a former goaltender, it was natural that I ended up working with the goalies. It was during this time that I saw the real need of a development plan for the goalies in Belgian hockey. Most goalies in Belgium played the position without any formal coaching from an experienced coach. Most of the head coaches that run the practice had no playing experience in the position. As a result, it was hard for them to understand what skills were needed to develop their goalies. My duties at RBIHF included a review of their development programs and plans. The Belgian goalie coaching education program (or lack of) was one of the things that I looked at. As my project on the topic was an overview of the goalie situation in Belgium, I felt it was in everyone's interest to expand on the topic. With today's advancement in information technology, there is a lot of information available on the internet among other traditional sources such as books and manuals. Therefore an objective of this manual is to help goalies and their coaches gather the important ones that applied to them.

One unique feature for this manual is that it will be built on the iBook author as an interactive manual with videos and pictures. The iBook will be available for its user to download and use on their iPad, iPhone and Macbook computers.

The evolution of the playing goal has changed quite a bit over the last two decades and it continues to evolve. Providing Belgian goalies and coaches with up-to-date information was also a goal for creating the manual.

Ice Hockey

Ice hockey is an invasion sport played with five players and a goalkeeper. The purpose of the sport is to score more goals than the opposing team. While the players try to score goals, it is up to the goalkeeper to prevent them. (Westerlund, 1992)

Due to the nature of the game, there is an infinite number of evolving game situations which requires the players to adapt to. Playing rules, manpower, player movement and positioning, speed changes are contributing factors to these evolving game situations.

1. Studies on Scoring

Studies have been done in recent years on scoring at the IIHF Mens' World Championships (MM), Olympics, Finnish Liiga (SM) and National Hockey League (NHL). Scoring is a reflection of the goalie's weaknesses. It can also show the goalie where the important parts of the game he should be working on and be aware of.

Type of Shot

A goal scoring analysis study by Niels Garbe on the over 7000 goals during 2006/2007 NHL season showed that "One-timers" from a pass, scored the most number of goals. Of the 2900 goals scored by top ranked teams, 1529 (52.7%) were scored this way. The next closest method was receiving a pass then shooting; 405 (14%). At the 2005 IIHF World Championships and 2006 Olympics, had similar results with 40.5% being one-timers and 24% from pass-and-shoot. (Mensonen and Salo, 2008) The time of the release is crucial because the longer it takes to place a shot, the goalie has more time to get setup. (Brown and Stenlund, 1997)

Shooting off a pass made the goalie's job more difficult because he has to work on two ends. First, to setup and following the puck. Then when it is passed, the goalie has to follow it then set up again for the shot. (Saarinen 1992). Also mentioned the greater distance the goalie has to cover the wider the angle for the shooter take the shot. (Westerlund 1992).

Reaction Time

"If a puck is shot from the blue line which is 18 meters to the goal, at 161km/h, the puck will reach the goalie in 0.4 seconds. This does not allow the goalie much time to block the shot." (Sharp, 2011)

Distance the Yardstick Falls	Reaction Time
5 inches	0.16 seconds
6 inches	0.18 seconds
7 inches	0.19 seconds
8 Inches	0.20 seconds

Figure 1 illustrates the reaction time people catching a falling yardstick. (Science of Hockey)

Scoring Technique

The best technique to score is the wrist shot followed by the slap shot and then tip-in's. Setting up and angles. When an NHL player has good control of the puck, the goalie should as much net coverage as possible. (Garbe, 2013)

Duration of Attack

Duration of attack had a lot to do with scoring. Among top ranked teams, the longer the attack, the less likely is the team to score. 0-5 second-attacks produced 38.8% (1126) of the goals while an attack lasting more than 20 seconds scored only once. Good positioning and angles of the goalie can deny or discourage an early shot and delay the play long enough to get defensive support. (Garbe, 2013)

Defensive Readiness and Area of Puck Possession

The defensive readiness of the team is also a factor. 1023 goals were scored on a "counter attack when the other team isn't organized" while 965 were on a "slow attack when the opponent is organized". It is also no surprise that the best area to gain possession was in the mid-offensive zone. So it is vital for the goalie to stay mental alert. (Garbe, 2013)

Direction of Attack

When it came to the direction of attack, "Forward towards the opponent" was the best way of attack with 54.9% of goals. The goalie's positioning, angles, telescoping/sculling methods can play a huge part in increasing his ability to stop a fast attack. (Garbe, 2013)

Handedness

The player's shooting hand showed a difference in number of goals scored. Left handed shooters scored 20% more goals than their Right handed counterparts. (Garbe, 2013) While several factors may contributed to this, it may show that because majority of goalies are left catching and (or) weaker on the blocker side compared to the trapper side. The left handed player has a forehand shoot that is on the blocker side.

Position of player/Scoring Areas

The position of the shooter was also studied. Centres scored more often than their wingers or defender teammates. (Garbe, 2013). While this is not a definite conclusion, there may be possible co-relation between the player's position and the areas of scoring on the ice.

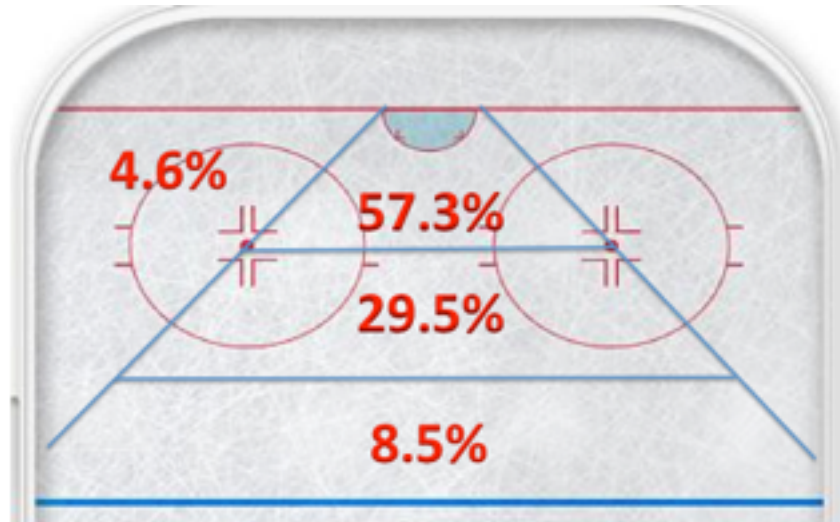


Figure 2. Scoring areas at the 2003 World Championships. (Sumkin & Vourinen, 2005)

The placement of goals is another part of the scoring study covered. During the 2003 World Championships, Sumkin and Vourinen found that the bottom of the net were where most goals were scored. The bottom right corner was the area that most scorers found (21%), followed by the five-hole (19.9%) then the left corner (18.9%). The other areas of the net (top corners, and middle sides) provided shooters with 10.3% or lower. Mensonen and Salo found in 2008 that the scoring areas on the net had changed at the 2005 World Championships and 2006 Winter Olympics. The bottom left and top right corners were the top two areas for goals while the five-hole, bottom right and top left corner had very slight differences.



Figure 3: Shows where goals were at the 2003 MM (bottom) and the 2005 MM/2006 Olympics (top)
(modified from Sumkin & Vourinen, 2005; Mensonen & Salo, 2008)

2. Sports development Model

2.1. Long-Term Athlete Development (LTAD)

Sport Canada's LTAD is a framework for sports development in Canada. Each stage of the LTAD reflects a different point in developing the player. (Sports Canada, 2010)

The Long-Term Player Development (LTPD) has been adapted from the LTAD by Hockey Canada to reflect the development and growth of a hockey player. The LTPD is based on the physical, mental, emotional and cognitive development of the hockey player. "Early specialization can be detrimental to later stages of skill development and refinement of fundamental sports skills." (USA Hockey, 2009). There are factors that influence the LTPD:

1. The 10-year Rule
2. Fundamentals
3. Specialization
4. Developmental Age
5. Trainability
6. Physical, mental, cognitive and emotional development
7. Periodization
8. Calendar Planning for Competition
9. System Alignment and Integration.
10. Continuous Improvement

(Sports Canada, 2010)

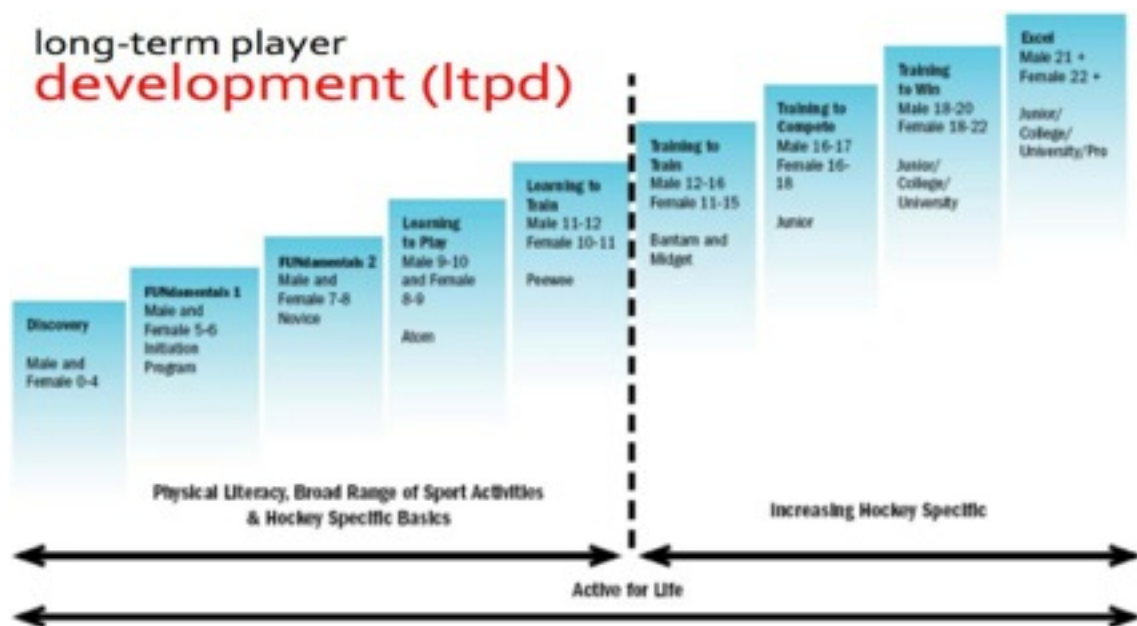


Figure 4: Long term player development (LTPD) Modified from Balyi, 2001

Goalies should be developed like other players with an early focus on athletic skills with specialization at age 11-12.

The focus from ages 0-12 (11 for females) is physical literacy, broad range of Sport activities and Hockey Specific Basics. Studies have shown that there is a window in which a person has to learn basic skills. After this window is closed, there is a “repercussion” and limitation on the abilities at a later age. (Sports Canada, 2010)

Discovery

Male and Female 0-4

- Fitness and movement skills development
- Learning movement skills (running, jumping, wheeling, twisting, kicking, throwing and catching)
- Some organized physical activity.
- Daily Physical activity.

FUNDamentals 1 & 2

Male and Female 5-8

- Overall movement skills
- Fun and participation.
- General development.

- Integrated mental, cognitive and emotional development.
- Agility, balance, coordination, speed, running, jumping, wheeling and throwing.
- Strength training is based on own body or lighter weights (Ie. Medicine or swiss ball).

Learning to Play and Train

Male 9-12; Female 8-11

- Overall sport skills development.
- All basic sport skills should be learned.
- Integrated mental, cognitive, and emotional development.
- Introduction to mental preparation.
- Strength training is based on own body or lighter weights (Ie. Medicine or swiss ball).
- Specific hockey training 3 times a week. Participation in other sports 3 times a week.

Intermediate: Learning to Train & Training to train

Male: 11-12; 12-16

Female: 10-11; 11-15

- Perfecting the stance; recovery,
- Movement in the stance; skating,
- Perfecting save techniques; blocking with body and limb.
- Positioning and angles.
- Using the stick.
- Playing behind the goal
- Communication.
- Game situation skills.
- Maintaining Habits.

Game Focus: Stop the Puck. Technical skills. Integrate tactical skills.

Advanced: Training to train & Training to Compete

Male: 12-16; 16-17

Female: 11-15; 16-18

- Perfecting technical skills and skating.
- Rebound control.
- Screens and Angles.
- Puckhandling
- Perfecting use of stick.

- Integrating tactics and systems.
- Creating an optimal stance.
- Creating a style that balances the goalie's strength and weakness.
- Input in development. (Drills and Practices)
- Perfecting movement and skating.
- Improving mental skills.

Focus: Perfecting Technical and Tactical skills, Execution, Compete.

(RBIHF, 2013) (IIHF, 2008)

2.2. Observational Learning

The transfer of information from coaches to players is important for effective acquisition of skills. Observational learning (also known as modelling) is the process by which we watch the actions of a model and adapt our behaviour to more closely match the outcomes or process of the event. (Horn & Williams, 2005) Modelling dominates the way coaches transfer information on to hockey players.

According to Miller and Dollard (1941), two types of behaviour exist. The first is "match-dependent" and it is a "follow the leader" behaviour from learner. The second is "copying" in which the learner has to adapt to become more like the model. The latter is the behaviour that coaches are looking for in acquiring motor skills. The objective is for the learner to be able to replicate or emulate a certain movement. Observational learning "success" can be measured by a specific qualitative and quantitative pre-determined criteria.

During an early stage of learning a movement (or skill), Scully and Newell (1985) observed that coordination is most dominant and the influence of a model is greatest. Carroll and Bandura (1990) found that reproductions of a movement were more accurate when there were higher numbers of demonstrations. Verbal cues only facilitated learning with high numbers of demonstration.

The sub-process of observational learning according to Bandura's (1998) Social Cognitive Theory (adapted from Bandura, 1986)

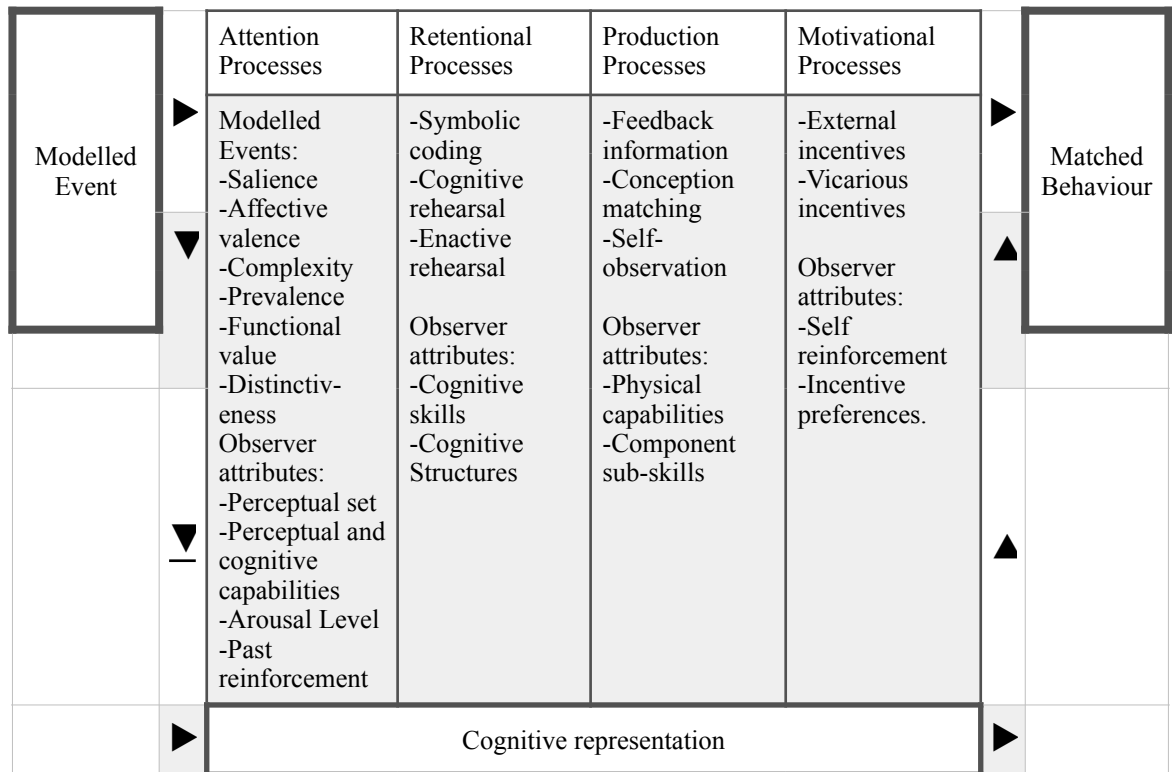


Figure 5: Bandura's Social Cognitive Theory (1998)

Various studies (Scully and Carnegie, 1998), (Horn 2002) (Scully and Newell 1985) (Carroll and Banduar 1990) have shown that learning a motor skill through observational learning (with the use of a model) is significantly more effective than methods that did not make use of a model.

2.3. A goalie development model for Belgium.

The top goalie producing nations in hockey (Finland and Sweden, etc.) have excellent programs in place. While they work for these nations, due to several factors (hockey playing population, culture, coaches education, etc.) these programs may not work with the same success if transplanted directly into a nation like Belgium. A goalie development model that is unique to the needs of a nation is essential for growth of development.

Belgium's culture and popularity towards the sport of ice hockey means that goalies do not necessarily start at the ideal age that those in top division nations do. Therefore

two types of models can be used in Belgium. The first is a more age-ambiguous model from USA hockey that is based on skill level.

Level 1: The beginner level is where the goalie starts and learns the foundation skills. Goalie Skating, Save techniques and recovery.

Level 2: The Intermediate level is where the goalie continues to practice and perfect the foundation skills like skating and save techniques. The goalie is learning to create his own style of play. Tactical skills are included in practices.

Level 3: The Advanced level is where the goalie is close to or have mastered the foundation skills. Maintenance of foundational skills is required as well as tweaking of those skills. Team practices will focus mainly on tactical skills.

(USA Hockey)

A model was proposed to the Belgian federation by the author for the ideal age of starting goaltending. The model recognizes the importance of skills before specialization while taking into account the uniqueness

Beginner: Learning to Play & Train

Male 9-10; 11-12

Female 8-9; 10-11

- Basic Stance, positioning, goalie and player skating.
- Principles of techniques (Catching and Blocking)
- Creating good habits

Game Focus: Stop the Puck

Intermediate: Learning to Train & Training to train

Male: 11-12; 12-16

Female: 10-11; 11-15

- Perfecting the stance; recovery,
- Movement in the stance; skating,
- Perfecting save techniques; blocking with body and limb.
- Positioning and angles.
- Using the stick.
- Playing behind the goal
- Communication.

- Game situation skills.
- Maintaining Habits.

Game Focus: Stop the Puck. Technical skills. Integrate tactical skills.

Advanced: Training to train & Training to Compete

Male: 12-16; 16-17

Female: 11-15; 16-18

- Perfecting technical skills and skating.
- Rebound control.
- Screens and Angles.
- Puckhandling
- Perfecting use of stick.
- Integrating tactics and systems.
- Creating a optimal stance.
- Creating a style that balances the goalie's strength and weakness.
- Input in development. (Drills and Practices)
- Perfecting movement and skating.
- Improving mental skills.

Focus: Perfecting Technical and Tactical skills, Execution, Compete.

(RBIHF, 2013) (IIHF, 2008)

3. The Goalie

The goalie is the player whose special role is to stop the (puck) from entering the goal. (Oxford Dictionary, 2014). The modern goalie is different from its predecessor as recent as from 10 years ago, they focus more than just making the save. The speed of the today's game have forced the goalie to be familiar with the things that happen prior to the shot ("pre-save") and after the shot ("post-save"). (Hockey Canada, 2011).

The "Shootout" or "Game Winning Shots" is a series of penalty shots taken at the end of a tied game to decide a winner. (International Ice Hockey Federation/National Hockey League Rulebook, 2014) With the introduction of the "shootout" into the world championships program, Olympics and National Hockey League (NHL) regular season games, the value of an effective goalie has gone up. Although the goalie cannot score in the "shootout", his performance still has direct affect on the result.

Of the 720 games played in the 2012-13 NHL season, 97 went into the shootout. (NHL.com 2013) That is roughly 13% of the games decided and 97 points awarded or lost. Points that may mean a team making the playoffs or not.

Like any other position, there is a need of technical skills (basic individual skills) before the goalie will be able to cope with complexity of tactical skills used in game situations. While it is certainly not possible for a goalie to stop 100% of the shots faced, elite level goalies are expected stop upwards of 90% of shots. Improved skills helps a goalie be more efficient and more effective.

Goaltending Styles

The evolution of goaltending has changed the look of the game of hockey tremendously since it was first played. According to the Windsor Hockey Heritage Society, in the original Halifax rules (as recorded by James Power), the goaltender was not allowed to drop to his knee to stop a shot. (The Birthplace of Hockey). As rules changed, so would the way of preventing goals. Before the goalie coach came into being, standing up and cutting angles were preached by most coaches as the best way to keep the puck out of your goal. Generally, blocking (or just getting in the way of the puck) was the way to go. This was prevalent went into the late 90's and 2000's. Styles went from the Standup (stay on your feet at all costs) to one that revolved around the Butterfly (save

or) position which aimed at taking away the bottom half of the goal. (Magnusson, 2013). A hybrid style which is a combination of both the standup and butterfly.



Figure 6: Save Selection: Blocking and/or Reacting (Magnusson, 2013)

More recently in success “goalie factories” like Sweden and Finland, rather than focus on which style is better, they have combined blocking and reaction saves. There is also a focus on controlling the rebound off the save and using active hands.



Figure 7: Combination of blocking and reacting (Magnusson, 2013)

Technical Skill vs Tactical Skill

Technical skills are the fundamental individual skills that the athlete needs to perform in order to play a sport. For a goalkeeper, it would be the basic stance, skating, movement, save selection techniques, stick/puck handling and positioning. (International Ice Hockey Federation 2008).

Tactical skills can be described as “the decisions and actions of players in the contest to gain an advantage over the opposing team or players” (Martens, Successful Coaching, p. 170).

Tactical skills can be divided into individual and team tactics. An example of an individual tactic is the positioning of the goaltender in a screen situation.

The goalie’s positioning, however, can also be part of a team tactic. For example, on a 2-on-1, the goalie’s positioning and actions can be relative to or determined by where his defensive teammate is positioned.

“Hockey sense is commonly used to describe a player who appears to anticipate what is about to happen on the ice and then reacts a bit sooner than the other players” - (Tearse 2014)

“Pre-Save”, “Save” and “Post-Save” (P.S.P.)



Figure 6: Pre-save, Save and Post-save chart (P.S.P.) Diagram

The P.S.P. is a flow of events that a goalie goes through when facing and making a save and after the initial save.

- “Pre-Save” are the things that the goalie needs to do to set up (or prepare) prior to the shot. These are usually technical skills like “Telescoping/Sculling”, the “basic stance”, positioning and angles.
- “Save” is the technique or save selection used to prevent pucks from going into the goal.

- “Post-Save” can be technical or tactical skills like recovery, puck tracking or rebound control.

4. Technical Skills

The fundamentals of goaltending are as listed:

- Footwork & Foot speed
- Balance & Agility
- Proper Angles & Depth
- Strong Technical Skills
- Solid Tactical Skills
- Good Recovery Speed
- Tracking & Adjustment Skills
- Rebound Control
- Athleticism & Desire
- Strong Mental Focus

(Hockey Canada, 2011)

4.1. Basic Stance

The Basic Stance is a ready position that a goalie adopts in anticipation of facing a shot from an opposing player. The basic stance has evolved along side the playing style(s) of goalies since hockey was first played. Goalies from the 1960’s would look different in his stance compared to a modern day one. They would stand with their legs closer together, stick flush against the pads and the catching glove would be held pointed down beside their pads. (McKichan).

There are five areas that the modern goalies need to focus on in their stance;

- 1)Leg Pads and Skates
- 2)Blocker,
- 3)Catcher,
- 4)Torso and shoulders
- 5)Stick.



Figure 7: Five areas of focus in the basic stance (McKichan)

The basic techniques of a good stance are these:

- 1) Feet are wider than the shoulders.
- 2) Knees bent
- 3) Stick flat on the ice, in front of the goalie.
- 4) Erect torso (Straight back)
- 5) Head up - Eyes on the puck
- 6) Hands (Catcher and Blocker) are in front.
- 7) Weight is distributed equally on both skates
- 8) Upper body and limbs are relaxed

(FIHA, 2010; Nykvist 1998)



Figure 8: Basic techniques of a good stance (Modified from FIHA, 2010; Nykvist 1998)

Stick Position

The Stick should be placed flat on the ice in front of the goalie to cover the five hole along the ice. Rather than placing the blade up against the pads, the blade should be roughly about a foot in front of skates or in a position that the goalie can see the blade without looking down. This will help cushion any pucks shot along the ice. (McKichan)

The goalie stick is designed differently than a player's stick. On the goalie stick, there is a paddle midway down the stick. The stick can be held with one of the goalie's index fingers pointing out as if holding a gun, preventing the stick from spinning. This is called a trigger grip.

Leg Pads

The goaltender's skate should be slightly wider than the shoulders. This will allow the goalie to drive down the knees when going down to a butterfly. The style that the goalie uses will dictate the goalie's stance.

Blocker and Trapper

As mentioned earlier the blocker is position beside the the top of the pad. The blocker should be in front of the goalie rather than touch the pad. The goalie should be able to see the blocker without turning the head.

The catching glove is similar to the blocker. There is more leeway with the positioning of the trapper because it is free of the stick. The trapper should be in front of the goalie with the open palm facing the shooter and the puck.

4.2. Skating and Movement

There is an old saying that states “the goalie has to be the best skater on the ice or the team.” Today that saying is only considered a half-truth. Today’s goalie has to be the best “goalie” skater on the team. The goalie has to be able to possess some of the basic skills of the player playing “out” but they have to perform “goalie skating” with greater proficiency. The skills listed below are those used by all goalies.

Basic Skating Skills

Skills that both used by hockey players regardless of position. Note: The “inside” edge refers to the side of the blade that is closest to the body while the “outside” refers to the side further away from the body. “Front” Or “Lead” skate or leg will refer to the one that is closest to the direction of travel. “Back” would refer to the one furthest away from the direction of travel.

Forward

The most basic of skating skills is the forward skating stride. While a goalie normally seen defending an area that is slightly larger than the 6”x4” goal frame, it is essential that the goalie be efficient in this skill. The goalie will need to (from time-to-time) skate to different areas of the ice to retrieve a loose puck as well as to the bench for an extra attacker.

Starting with the feet underneath the body. The drive skate should be pointed out from the support skate. Using the inside edge of the blade, drive out in a 45 degree

angle (relative to the support skate). Thrust out and fully extend the skate. Full weight should always be on the support leg while gliding. Note to swing arms in a forward and back motion. The shoulder and the support leg should always be in line. (Davidson, 2010)

Forward Glide

Going behind the net to retrieve a loose puck or stopping a rim is something the goalie has to do during the game. Due to the speed of the puck and the distance between the end boards the goal frame, the most efficient and effective technique with minimal movement is doing the forward glide. While not as powerful or fast as the full forward stride, the forward glide allows the goalie generate quick forward speed in a small area with the ability make a tight turn.

Similar to the forward stride, the drive skate pushes out 45 degrees from the support skate. Rather than alternate drive and support skates, the drive skate replicas the motion with quick repetition until the goalie gets to the desired distance. The support skate bears the body's weight and is pointed to the direction of movement. The outside edge of the support skate should be used if turning is required.

Stopping

Snow Plow

The "Snow Plow" is one of the first stopping technique that is taught to most skaters because simplicity of execution. The technique gets its name from the skates mimicking the front of a snow plow.

In a forward glide (with both skates on the ice), the skater pushes out the backend of both skates by putting pressure on the heels of the blade. The technique ends with pressure being put on the middle of the blades and the toes pointed towards each other.

Hockey Stop

The hockey stop allows the skater to stop quickly while in fast speed. It also allows the skater to make quick directional changes.

Two Foot Stop

While in the forward stride or glide, the skater will “turn both feet 90 degrees to the direction of travel while your momentum carries in your original direction. Body weight is put onto the skates by bending the knees. The deeper the bend, the more pressure is applied to the blades. The upper body will lean away from the direction of travel. (Davidson, 2010) Note: the inside edge is used on the front skate while the outside edge on the back skate.

One foot Stop

Executed similarly to the two foot stop, except the skater puts all of his weight onto the front skate and none of the back skate. The skater usually keeps his feet apart to quickly maintain balance following a complete stop. For the goalie, this stop would allow him to go into his ready stance almost instantaneously.

Goalie Skating skills

The following are skating skills unique to the hockey goalie. These skill sets are used while facing a shot or getting ready to make a save.

T-push/Glide

The T push, allows the goalie to cover a large amount of distance in little time. For this reason, the T-push used in a cross-ice pass situation or incorporated into the two-pad stack in a similar situation.

To perform the T-push, the toe of the lead skate should be pointed towards the direction of movement. The back skate should be perpendicular to the lead skate. The skates will create the letter "T". (Corsi, 2002) The back skate will provide the drive by pushing off while maintain the "T" (which is where this skill gets its name). Note: The skates should not touch as any point of performing this skill.

Shuffle

A more compact movement technique compared to the T-push. Used mostly in tight situations with minimal changes in the goalie's stance. The shuffle allows the goalie to move laterally while maintaining a relatively stable stance.

The shuffle is performed while the goalie is in his basic stance. The skates should be parallel relatively to where the puck maybe. The anchor/support skate is the direction the goalie is moving while the opposite skate is providing the drive. (ie. Left anchor/

support leg means the goalie is moving to the left while the right skate is push and vice versa.) In his basic stance, the goalie will push off with one skate while the while stays in a relatively similar position. The weight of the goalie will be on the anchor/support leg. After pushing off, the drive skate will return to it's original distance relative to the support skate. If multi pushes are needed, the drive skate should return to a distance where the inside edge of the skate blade is able to catch the ice to push off. Note: The only movement that should happen is in the drive skate/leg. The blocker, trapper, chest, stick should stay in the same position. Do not bob up and down, the shoulders should be levelled and the height does not change. (Corsi & Hannon, 2002)

C-Cut

This is a skill that allows the goalie to maintain his stance while moving forward and backwards. To start the (forward) C-Cut, the goalie should first put pressure on the heel of the skate(s) and push outwards. If both skates are used, the front of the skates should be pointed to 45 degree angle away from each other. The skate(s) should then be push through the path of an arc, ending with the front of the skate(s) pointing inwards (similar to a "snow plow" stop). The name of this skill comes from the "C" shaped skate mark left on the ice. A backward C-Cut is perform in manner opposite to the forward movement, starting pressure from the front of the skate(s) and ending in the heel. (Daccord, 2009)

Telescoping/Sculling

This is a motion that is frequently used during a game to move out away from the goal and back towards it. "On a breakaway, the goalie would "telescope" out from the net to cut down the angle and retreat when the shooter comes in closer." (McKichan, 2003) This movement is a combination of a couple of skills; the forward and backward C-cuts ,and the snow plow.

When move away from the net, a forward C-cut is first performed when the desired distance is reached, a modified snow plow (on one skate) is used to stop the movement. To retreat back into the net, a backward C-cut is performed. To stop, the goalie may use modified reverse snow plow on one skate or even both skates.

4.3. Pad movement

Butterfly slide and Push

This technique allows for puck coverage and quick lateral movement without the goalie having to recover onto his feet from a butterfly.. A goalie may use this to stay with a rebound or loose puck after performing a butterfly save. This may be performed in a situation where the goalie needs to save time and travel a short or a longer distance. The technique also allows the goalie to go into a butterfly position (immediately) with minimal movement of the rest of his limbs.

The butterfly slide/push starts with the goalie in a butterfly position. This technique is similar to the shuffle. The goalie is essentially performing the shuffle in a half butterfly position. The first step is to lift the drive skate and bring it to a position where the inside edge of the skate can “bite” into the ice allowing for the push. The skate is then pushed away from the direction of the movement. The goalie may repeat this multiple times to reach the distance he needs to travel. This movement is performed while the anchor pad is flush along the ice and the rest of his equipment is positioned where they should be if he was still in a full butterfly. The movement ends when the drive skate/pad is back down in a butterfly position, flush along the ice. There may be a need to stop the movement or change directions.

In order to stop, the anchor pad/skate will need to be lifted to a position where the inside edge of the skate is able to dig into the ice to stop or slow down. The pad on the drive leg will drop down to a butterfly position with the pad flush along the ice. To change direction, the simply switches drive and anchor legs.

The goalie may need to move to a direction that is slightly behind him. In this situation, the goalie will need to rotate his hips/pads while he is lifting up the drive skate. This will allow him (and his equipment) to square up with the puck once he reaches it.

This movement also allows for the goalie to recover back into his basic stance. This is done just by lifting the anchor pad off the ice. (McKichan)



Figure 9: Butterfly Slide

Pad shuffle

This is another technique that is done in the butterfly position. In a situation where the puck is tight on the goalie but it's moving short lateral distances, the goalie may choose to stay in his butterfly in order to maintain net coverage.

The goalie simply alternately lifts his pad slightly off the ice and “tip-toes” towards the direction he is going. All this while maintaining his butterfly position.

Save Techniques

Mastering basic save techniques are critical to the goalie's game as they are skills used to prevent goals. Paying attention to the details of each technique reduces the chances of getting beat on the first shot as well as controlling the rebound.

4.4. Pad saves

Standup

The most basic technique that a goalie can learn. It is the most simplified technique and requires the least amount of movement on the goalie's part. The Stand up save can be used to stop a long shot or dump in. This is a save that many goalie coaches have left out because it is largely replaced by the butterfly. Since this is mainly used on shots from a distance, it allows the goalie to play the puck immediately

From the basic stance. The goalie closes his pads, brings his trapper and blocker down against his body to close any gaps between his limbs and his body. The stick blade should be placed in front of the five hole to cushion the pucks that along the ice. Tilting the pads on an angle knocks any pucks shot off the ice down to the ice.

Butterfly

The Butterfly is one of the most commonly used save technique in a goalie's arsenal. The butterfly mimics the wings of a butterfly with the pads flared out "symmetrically" to both sides. along the ice. It is especially effective with low shots and net cover while allowing to recover quickly for a rebound.

Starting from the ready stance, the goalie drives his knees down on the ice while his skates are kicked out so the face the pads are facing the shooter. The stick should be placed with a gap between the pads and the blade. The face of the blocker and open palm of the trapper should also face the shooter. Elbows tucked close to the torso. The height of the trapper and blocker should be determined by the height of the shot.

Half Butterfly

The half butterfly save allows the goalie to extend his leg pads for a shot that are just outside the range of a normal butterfly. (McKichan)

In the butterfly, the goalie lifts his knee and stretches out the pad. Since the five hole is exposed when the knee is lifted off the ice, the stick must be placed in front on the side of the extended pad for coverage. The trapper/blocker should be extended out over the extend pad while turning the shoulder to the same side.

One leg up (Vertical-Horizontal)

The one leg up or Vertical-Horizontal technique is a good way to cover the low corner of the goal against wraparounds and bad angle shots from the close to the goal line. This technique is also good for any centring passes from the corner as the goalie is already in the load position for the butterfly slide. (McKichan)

From a standing position the goalie should jam his pad against the strong side post. Ensure that there is no open gaps between the pad or skates and the goal post. The goalie should drop on one knee down in a butterfly position. Keeping the trapper or

blocker up for net coverage. If a wraparound is attempted on the trapper side, the goalie may put his stick down in a paddle down position or extend his stick for a poke check.

A common confusion by goalies is when to or not to go into the one leg up position. Since the far knee is dropped down on the ice, the height of the shoulder also goes down, exposing the top corner. It is dangerous especially with a player on the off wing. As a rule of thumb, the goalie should only use the technique when the puck is no higher than one metre (or a stick length) away from goal line. The goalie should square up and challenge if the puck is in the zone higher.

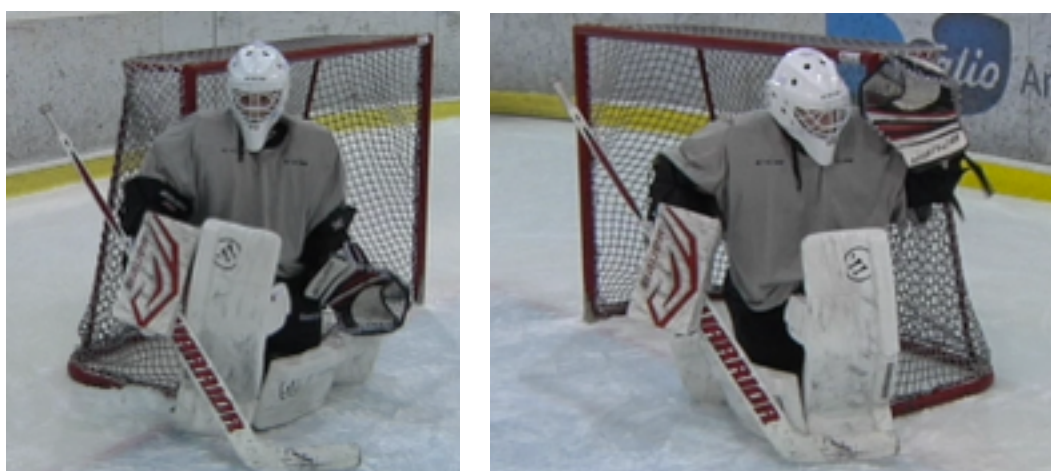


Figure 10: One leg up or Vertical-Horizontal

Two Pad Stack



Figure 11: First step to the two pad stack. T-Push

The two pad stack is a technique that is used in desperation situations. Usually when cover a lot of the net quickly. One situation like a cross crease pass where the goalie is caught in long distance from the shooter. (McKichan)

The execution starts with the T-push. As mentioned before, the T-push can be used if the goalie needs to travel a long distance. The toe of the lead skate is pointing to the direction of travel. A deep knee bend is need to support the weight of the body in the initial push. It is important that the drive leg is kicked out and flush with the top pad, creating a “wall”. The trapper/blocker should sit on the top pad extending the “wall”. Note that the shot may actually be higher than the “wall” of equipment. In a situation like this, the goalie may move the trapper/blocker and pads higher to block the puck.

If the direction of the save is towards the glove side, the stick can be in one of two positions.

- 1) Flushed along the ice in front of the pads to prevent pucks going underneath the pads.
- 2) Flushed along the ice extended outwards forming and reverse “L” shape. This is prevent a second pass back in the opposite direction. It may also allow the goalie to cover any rebounds within the range of the stick.

Quick recovery from this technique is crucial since there will more than likely be a rebound and the goalie will be on the ice after execution.



Figure 12: Two pad stack on both sides

4.5. Upper Body Saves

Trapper

The most versatile piece of equipment that the goalie possesses is the trapper (or catcher). The goalie can use the trapper to catch/trap and block shots or cover loose pucks to freeze the play. The trapper can be used in almost any position as an extension of his body.



Figure 13: Making a save with the trapper in the butterfly

Using the trapper to catch pucks is fairly straight forward. Here are a few points that a goalie (especially, new ones) should take note of:

- 1) Keep palm open until the puck has entered the catching area.

- 2) Wait for the puck to come into the glove.
 - 3) If needed, turn the face of the glove rather than “punch” or wave at the puck.
 - 4) Keep eyes on the puck. Following it all the way into the glove.
- (McKichan)



Figure 14: “Follow the puck into the glove”

Active hands refers to the goalie using his catching glove to control rebounds. Rather than using other pieces of equipment to block or deflect shots, the goalie can easily take away any rebounds by catching pucks when possible.

Gut Trap

A technique that is used for shots that are midline of the body. Properly executed, the gut trap allows the goalie to eliminate rebounds and gain possession of the puck.
(Mckichan)

The gut trap can be used while the goalie is on his feet or (going) down into the butterfly. As the shot hits the goalie, he will bring his trapper (in a “basket” method) and his blocker up into his torso.

Blocker

The blocker is used mainly as a tool to block and deflect shots. The most common way of using the blocker is deflecting the puck into a safe area (corner) where players cannot get to a rebound for an immediate shot. (Nordman, 2013) The goalie may also “punch” the puck to a teammate for quick up-ice transition.

Blocker/Trapper Combo

A skill that is used infrequently by the goalie because the timing needed to execute. Rather deflecting shots fired at the blocker, the goalie uses the trapper to hold the puck against the blocker and eliminate rebounds.

4.6. Covering the puck

When pressured in his crease, the goalie has the ability to hold the puck and stop play without being penalized, a privilege that no other player on the ice may do. The first and most important thing to do is “Stop the puck”. A common mistake among younger and newer goalies is trying to cover a puck that is moving towards them and having the puck slide underneath them. (Mckichan)

The most common way of stop the play is with the trapper. The goalie may hold it after catch the puck from a shot. Or if the puck is on the, he may cover it up. Although the puck may be covered up, a lot of players may try to dislodge the puck until they hear the whistle to stop play. This means the goalie needs to cover the puck in a safe and secure manner. Place the stick in front of the trapper may prevent needless injuries like a broken finger. On one knee (or half butterfly), he can hold the stick up right with the blade flat on the ice. In the butterfly, he may use a paddle down method. For either situation, the goalie should place the trapper against a leg pad that is flushed on the ice to provide support. It is not uncommon for the goalie to cover with the trapper in front on a paddle down stick if there is no time. From time-to-time, the goalie may lose sight of the puck underneath him. This may lead to a scramble in the crease. One common method is to lay flat on the ice with trapper and blocker tight against the torso and the leg pads close together.



Figure 15: Covering the puck in a half-butterfly.

4.7. Stick Saves

The stick is an important piece of equipment for the goalkeeper. The stick is normally used to cover the five hole and to stop low shots. The basic stick save technique is initiated by turning the shoulder. The stick is turned at an angle to deflect the puck into the corner. (IIHF, 2008) As a rule of thumb, with shots on the glove hand side, the toe of the blade should point to the corner. While on the blocker side, the heel should be pointed to the direction of deflection. The stick save can be used in a stand up position or while down in the butterfly or half butterfly.

Paddle down

The paddle down technique is usually used in situation where the puck is in a tight space in front of the goalie (ie. rebound, deke). It is also used on wraparounds from behind the goal. Some times the goalie will use it on a low shot from a long distance or a puck that is not flat on the ice. The technique involves putting the stick paddle flushed with the ice and the face of the paddle facing the puck. It may be used in a butterfly or half butterfly. (Näckel, 2004) A goalie may use the “back side” of the paddle, usually in a desperation situation where he does not have time to square up on the puck.



Figure 16: Paddle Down

Poke Check

The poke check is a skill that can often eliminate scoring chances before they occur. Similar to the poke check used by a defensive player to knock the puck off the puck carrier's stick. An effectively executed poke check can surprise the puck carrier before he can react. (McKichan) The poke check can be performed in a standing, butterfly or diving position. A goalie may also choose to combine the poke check with the two-pad stack.

The goalie's range. The goalie should know the limits or how far he is able to reach with his stick extended or retracted and in different poke checking positions. To find his range needs to do is extend his stick to the very and reach out as far as he wants to on the poke check. This should be tried in the stand up, butterfly (or half butterfly), diving and two pad stack and paddle down positions. (McKichan)

To perform a short poke check, when the puck is tight to the goalie, he may lunge out with his blocker hand in the trigger grip position.

For the long poke check, the goalie needs to slide his grip from the edge of the paddle to the butt end of the shaft. This can be either "throwing" the stick forward towards the puck or the goalie may slide his hand back to the butt edge before "thrusting" the stick at the puck or blade of the puck carrier. (Corsi & Hannon, 2002)



Figure 19: Diving poke check



Figure 18: “Long” poke check

Fake-Poke Check

“A fake poke check by definition is a deceptive movement of a goaltender’s stick, shoulder or body that fools an attacker into believing a full blown poke check is imminent” The fake poke check puts pressure on the puck carrier to make a quick or decision. (McKichan)

Sweep Check

The sweep check is used in a situation similar to a defenseman. Usually when a player is walking out around the goal with the puck for a wraparound or a pass. After extending the stick, the goalie swings the stick (flush on the ice) at the puck or blade of the puck carrier. (McKichan)

Note: Hold the leg pad/skate against the post. There may be situations where the sweep check is successful (or unsuccessful) and the puck slides towards the goal. Since the stick and blocker is extended out, the goalie may not have the chance to get his hand back in position to keep the puck out.



Figure 20: Sweep check

Paddle down -Poke Check

In a situation where the goalie tight to the puck and is down with the paddle down (ie. deke, deflections or tips). “As the blocker is driven to the ice the paddle is positioned firmly on the ice with no holes under it.” (McKichan)

4.8. Puck Control

A goalie who is a good puck handling is often described as a “3rd defenseman”. The goalie who is able to move the puck effectively can nullify offensive pressure by getting the puck away from attacking players. He can also start a breakout or an offensive play from within his own zone. (McKichan)

Stickhandling

First the goalie will slide his blocker hand all the way to the knob of the shaft. This allows space for the trapper to hold the middle part of the stick. There are two ways of gripping the goalie stick with the trapper.



Figure 21: Traditional or underhand grip

- 1) Traditional or underhand. This method is normally how a player would grip a stick. The webbing of the trapper is closer to the blade and just above the top of the paddle.
- 2) Over hand. This is the most commonly used grip with the modern goalie. This due to the ease of gripping the stick with the oversized trapper. The goalie grips the shaft with the webbing up closer to the knob/butt-end. (McKichan)

Note: Due to safety requirements, the face of the trapper is heavily padded which leaves very little feel of the stick. It may help to know that the gap bottom of the trapper (around the third finger and pink) will give the goalie the best feel of the stick.

A well broken in trapper will also be help with the grip.



Figure 22: Overhand grip

The one-handed method allows the goalie to control the puck quickly without having to move the hand position. The goalie may slap or sweep the puck with the backhand. If the goalie is strong enough, he may just hold the stick with the blocker hand alone. The goalie may also use his hip or back to support the shaft and leverage.

Moving the puck

When given possession of the puck, the goalie usually makes a pass to a teammate, clear it away from an opponent or dump it down ice.

Passing

The goalie has three options when it comes to passing to a teammate.

Direct

The pass may be direct “tape-to-tape” to a teammate. Sometimes goalies are also able to make long passes out to a teammate outside the defensive zone. This would depend on the puck moving skills of the goalie. If an opponent is in the way, the goalie may make a “saucer pass.” (McKichan)

Indirect

The indirect pass is usually used when there is a player in between the goalie and his teammate. The goalie may elect to bounce the puck off the boards (or the back of the goal) to a teammate. (McKichan)

Rim

A second method to use the boards is to rim or move it along the boards or glass. This is a safe way to make a long pass as the puck is put as far away from the open goal as possible. Because no two rinks are exactly alike, it is important for the goalie to know the boards in the rink to anticipate possible unexpected bounces.

Stopping the Rim

An attacking player may rim the puck into the zone for different reasons. Depending on speed of the puck and the side it is rimmed in, the goalie has a couple of ways to stop the rim.

When leaving the crease (to go behind the net), the goalie should start with a T-push and skate as directly to the boards as possible. On the trapper side, the can elect to get

his body flushed up against the end board. While keeping the stick blade in front of him. The other way to play the puck on the trapper side is to go straight into the “shooting position”. Keeping the blade flat on the ice. This will allow him to play the puck immediately. If the goalie judges that the rim is too fast and he is not able to reach it in time, he may choose to extend his stick and jam the stick against the end board while doing a glide turn. On the blocker side, since it is rather difficult to get the body against the boards due to the stick. The way to stop the rim is to turn the blade into a “backhand” method and jam the stick blade against the boards. (Corsi, & Hannon, 2002).

Long Dump-in

The long dump-in may occur as an attempt by the opposition to clear their own zone or to surprise the goalie. The dump-in could be on goal so the goalie must stay alert at all times. There are different options for the goalie; 1) Stand up 2) Half Butterfly 3) Butterfly 4) Paddle down.

To ensure that the puck does not go under the stick blade, the trapper should be placed behind the stick as support.

Setting up the puck

A common practice for teams during a line change is to dump the puck into the offensive zone away from their own goal. Some times the dump-in is on the goal while other times, it may be a rim. In either case, if the goalie should have control, he needs to put the puck in an area that is easy for his teammates to pick it up.

If the puck is recovered from a rim, the goalie should leave the puck behind the net, preferably away from the end boards and the back of the goal frame. This makes it easy for a teammate to skate in pick up the puck and skate with it. If the puck is controlled from a long shot, the goalie can move the puck (with the one hand method) to the side of the goal or behind it, if there is time.

4.9. Positioning

The goalie’s positioning can reduce a lot of needlessly wasted energy throughout a game. Where the goalie positions himself can also dictate certain situations in a game. An attack player shoots, elects to pass or just hold onto the puck according to the goa-

lie's positioning. It may take away time and space, (IIHF, 2008) and options for the puck carrier or even cause a change of possession.

Angles

The angle of dictates how much the goalie's equipment is covering the puck's trajectory to the net in a standing position. Since no goalie can actually cover 100% of the goal, there are "holes" where the shooter can shoot to score a goal. The combination of a good ready stance and good positioning should distribute these "holes" equally or minimize them. Although the goalie will be required (in most situations) to move to cover these holes after the shot is taken. (McKichan)

The goalie's positioning is relative to the position of the puck and the goal. (Kilpivaara, 2012) While the goal is in a permanent position, the puck is moving and in infinitely changing positions on the puck. The goalie "playing his angles" is trying to get as much of his equipment in the way of the puck's trajectory to keep it from going into the goal. A general rule of thumb is that the closer you are to the puck the more of your body is in its way. This dictates the depth of the goalie from the net. Due to the speed of the puck, size of the goalie equipment and his mobility, the goalie cannot follow inches from the puck. The goalie will stand in an optimal depth that allows him the best net coverage as well as time and space to move to the best position to stop a shot from a puck that has been passed.

The horizontal angle where the goalie should stand is fair simple. To distribute the "holes" equally, the goalie should line up from the middle of the net then with the puck. The goalie should always line up with the puck NOT the shooter. (McKichan)

Shot location

Shots can be located in three different levels of the goal. The Low/On ice, Middle, and High parts of the goal. The save selection for each level will differ slightly and save selections will often overlap each level. The IIHF manual breaks the saves up into three basic save models. The Stand-up, half butterfly and butterfly. (IIHF, 2008) In this manual, addition save selections are given.

Low/on-ice

In Figure 3, the low parts of the goal is where goals are most commonly scored. Goalies will see the majority of their shots low or along the ice so it's important to cover this part of the goal well.

Save Selection:

- Stick: Blade flat on the ice or paddle down.
- Standup. From long distance where a threat of tips and deflections and pucks going to the corner are lower.
- Butterfly or half-butterfly.
- Two pad stack.
- Blocker or trapper. Normally the latter if the puck is slightly off the ice.

(IIHF, 2008)

Mid-height

Save selection:

- Standup. Long distance shots.
- Trapper
- Blocker
- Gut trap
- Butterfly: Blocking with the torso or arms in the butterfly position.
- Half-butterfly
- Stick: This is to a lesser extent as there is less control on the rebound from the paddle. This is usually an unintended block from a puck that has changed directions.
- Two-pad stack.

(IIHF, 2008)

High

As goalies have become very efficient at covering the bottom of the goal, the top of the goal is one of the best places to score in hockey today. For this very reason, manuals on scoring have put an emphasis on shooting high on goal. (Gendron, 2003).

Save Selection:

- Trapper
- Blocker

Hands should be brought in front of the body. Cruciate for shots taken close as the goalie should bring his glove as close to the puck as possible. (Niemelä, 2011)
Standup.

5. Tactical Skills

5.1. Individual Tactics

Breakaway/Penalty Shot

Breakaways usually happen when there is a breakdown beyond the top of the face-off circles (ie. Powerplay, Cross ice pass, bad line change). In most situations, the goalie will have sufficient time to prepare for the shot.

The shooter has two options: 1) Shoot 2) Deke.

The shot option is fairly easy for the goalie to react to. Any of the basic save techniques can be an option. This is where it's crucial the solid techniques can make a difference.

The deke option is a little more complicated by also a higher risk move for the shooter as there is a chance of mishandling the puck or simply skating out space. A goalie will usually go into a half butterfly or splits when deked laterally. Keeping the stick blade in front or going into the paddle down technique is helpful as the shooter may make a short lateral deke to make the goalie open up the five hole. A good idea is to try to eliminate the shot option and force the deke. This can be done by challenging the shoot and cutting down the angle. (McKichan)

The goalie should start at (at least) the top of the crease then move backwards to maintain a good gap between himself and the shooter. This will put pressure the shooter to make a quick decision or risk running out of space and net.

Shot from a vertical pass

Passes coming from the end boards may pose problems for the goalie because he is unable to follow the puck and see what's happening in front of the goal at the same time. In this situation, the goalie should concentrate on following the puck while taking a quick peek in front to see if there is a potential scoring opportunity. Any passes that may come within the goalie's range (especially the goal crease) should at least be broken up or deflected away from the receiver. The goalie needs to be alert and move

quickly into any passing seams within his range. In most situations, movement should be done while standing up. In close situations, (I.e. wraparounds or walk outs) the goalie may choose to go down in the butterfly or half-butterfly. For any passes that reaches the receiver, the goalie needs to be ready for a shot. The goalie needs to move out far enough to challenge the shooter. (FIHA, 2010)

Puck carrier cutting across the ice

An option for the puck carrier is to make the goalie move laterally to expose holes in his coverage. This situation calls for the goalie to follow the puck carrier with quick shuffles. This is done while maintaining a basic stance, staying squared to the puck and being ready for the shot. In close situations, the goalie should be aggressive (with poke checks) while maintain good net coverage. Shots from high areas of the zone should allow the goalie more time to react, therefore, the save should be more reactive without allowing unnecessary rebounds. (FIHA, 2010)

Lateral passes

As mentioned earlier, one-timers have the highest scoring efficiency for shooters and majority of one-timers come from a lateral pass.. This demands the goalie to react quickly to the play and many times cover a long distance to make a save. The goalie should be squared to the puck and always be ready for a shot. The best way to follow the puck is to move parallel along with the pass. Butterfly slides is one of the faster options while maintaining a lot of net coverage. A T-push is the best way to cover a long distance (ie. Harsh mark-to Hash Mark). The goalie should maintain a basic stance before the shot is taken. This will allow the goalie to react to the shot. (Kilpivaara 2012). The two-pad stack is also and option if the goalie feels that he is not able to reach the shot in time.

Walkout

Many times a shooter will choose to take the puck in front of the net to get a better angle. The goalie should follow the puck and start in the stand up position. The goalie should have the positional advantage over the shooter if the puck is in or close to zones 1 or 4. The goalie should stay tight to the post and poke check pucks coming into his range. The paddle down position and one-leg up are also options. Walkouts coming from higher than a stick length from the goal line are played differently. The goalie needs to stay square to the puck and maintaining net coverage. These are quick

situations which means movements along the ice are most efficient. Butterfly slide, paddle down, poke checks, two pad stacks, half-butterfly are all options depending on the situation. The goalie can play fairly aggressively.

Close rushes

An one-on-one rush where the shooter has just beaten the defender and is cutting in from the outside is a close rush. The goaltender needs to challenge to the top of the crease to cut the shooting angle. If the defenseman is unable to catch up and take away the middle lane, the goalie will most likely need to move laterally. The butterfly and butterfly slide are the most efficient in this situation. (Kilpivaara, 2012) The poke check, two-pad stack, half-butterfly are other options.

Behind-the-net/Wraparound

One of the areas where younger goalies have trouble with is when the puck is behind the goal. Where should the goalie be facing? Where should the goalie be standing? First rule in this situation is that the goalie's body should be facing up ice. (Daccord, 2010) If the goalie has his back away from his end boards, he risks not seeing the player behind him and he is unable to stop a shot coming on the open goal.

In order to teach a goalie where to stand, the area below the goal line has been broken into four zones.

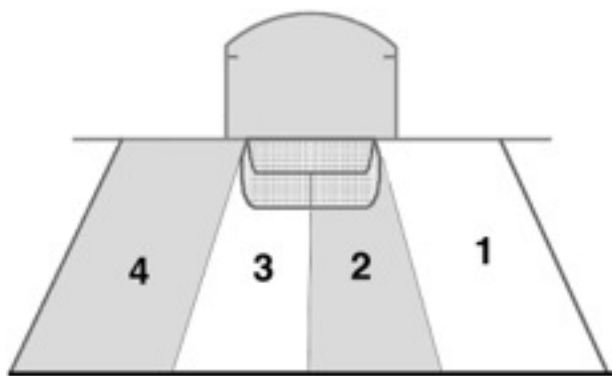


Figure 23: The ice behind is divided into four zones. (Modified from CBC)

Zones 1 & 4

These are the areas to the sides of the goal. It is most vulnerable to a wraparound so the goalie should be “hugging” the post with his skate and stick/blocker (or trapper) and ensuring that there is no gap between him and the post. His hip should be inside

the goal frame. Note that the stick blade should be perpendicular to the pads and post if he is hugging the post on his trapper side. (CBC, 2008)

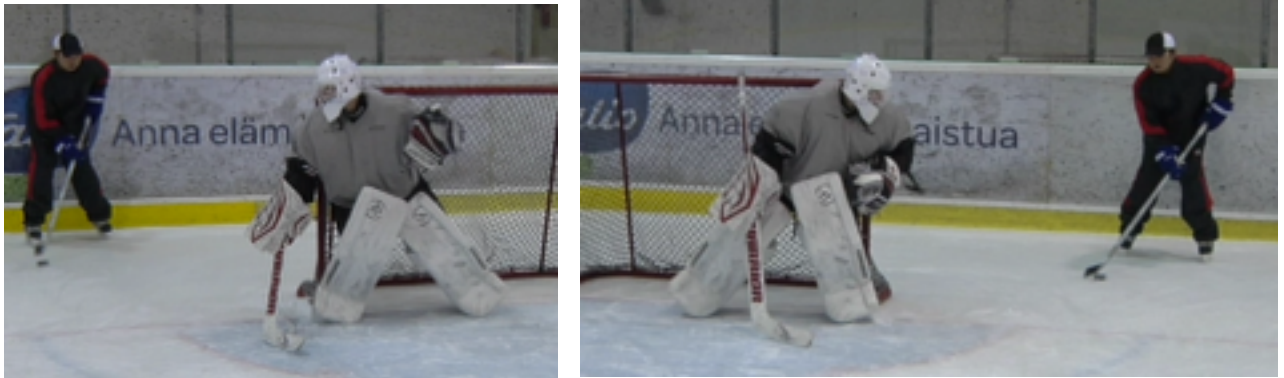


Figure 24: The goalie's positions in zones 1 & 4

Zones 2 & 3

The goalie should be off the post when the puck is in these zones. The goalie needs to stay low under the crossbar while peeking over his shoulder. In Zone 2, the goalie should be looking over his right shoulder. In Zone 3, he should be looking over his left shoulder. When coming off the post on his stick side, the stick knob should be outside the goal to make it easier to hug the post if he needs to go back to zone 1 or 4. (CBC, 2008)

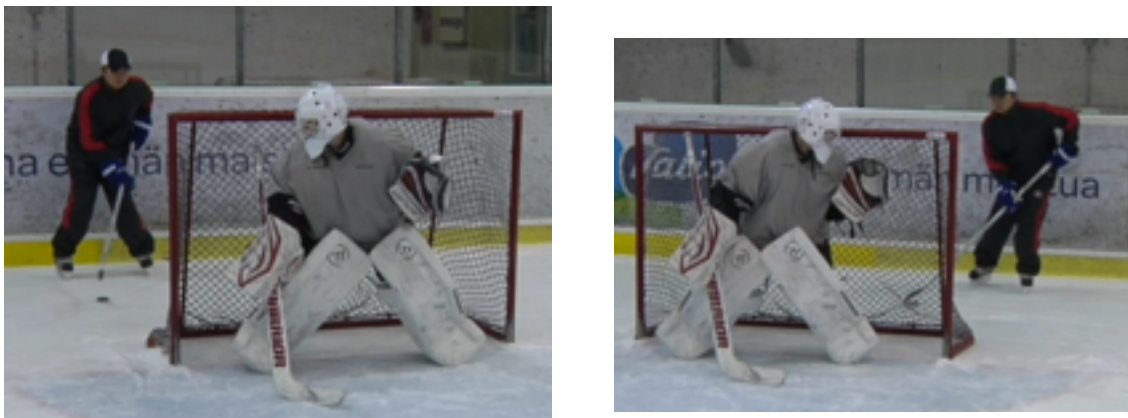


Figure 25: The goalie's positions in zones 2 & 3

Screens

A screen is a player that is standing in the way of the goalie and from a full view of the puck. It may be an intentional screen setup but an opposing player. Or it may be an unintentional screen by a teammate.

The unintentional screen by a teammate is fairly easily rectified by simple communications. The goalie may yell “Screen” or any phrase that allows his teammate to know he is in the way. This will let the player know to move out of the way or that he has to prevent the puck from getting behind him.

An intentional screen by the opponent is a little harder to deal with. The goalie’s object is to find the puck in a screen situation. This can be done by looking around or over the screening player’s body. Since the shot may come at any time with the goalie seeing the shot, he must be in the ready stance at all times. He may also choose to push the player far enough that he can not interfere with the goalie’s movement. If the shot is released, the goalie should drop into the butterfly (stick flat, knees close, feet fanned out and gloves open). (Mckichan) The goalie should get as close to the screen as possible to minimize any change in direction on tips and deflections. If the goalie is able to stop the first shot, there will most likely be a rebound so he must be ready to track the puck or for a second shot.



Figure 26: Looking around the screen.

Deflections

Positioning as close to the stick as possible. This takes away the angle of the direction change making it easier for the goalie to anticipate the change without having to make too much movement. The butterfly is the most efficient way for net coverage and rebound control. In this situation, the goalie squares up with the puck and bring his hands further in front of the body and close the holes between his arms by bring the

elbows tight to his body. The goalie is essentially creating a “wall” to block shots that he cannot react to. (Kilpivaara, 2012)



Figure 27: Create a “wall”.

5.2. Combined Tactics

Odd man attack:

2-on-1

One of the most odd man attack that the goalie will face is the 2-on-1. The puck carrier has two options in this situation. He may choose to shoot the puck or make a pass to his teammate. This is a situation where the goalie and his defensive partner have different roles to play. The conventional way of play the 2-on-1 is for the goalie to take the shooter (or shot) and the defenseman to break up or intercept a pass from the puck carrier. The goalie should challenge and take away good shooting angles. The defenseman needs to stay in the middle lane (take away his ice) and force the shooter to a poor shoot angle while taking away his passing seam. Essentially the goalie is looking to stop a shot while forcing a pass while the defenseman is doing the opposite of anticipating a pass and forcing a shot. Played well, the puck carrier will 1) take a bad angle shot that the goalie can easily handle 2) Make a pass that is intercepted by the defensemen 3) run out of time and space.

While played perfectly, the 2-on-1 is a scoring opportunity easily negated. The goalie should anticipate that a pass may get past his defenseman. In this situation, the goalie will need to move laterally across to make the save. (See laterally passes).

The 2-on-1 is the basic way of playing an odd man rush. Other types of odd-man attacks is played the same way with additional situations to play. Ie. In the 3-on-1, a vertical pass (in the form of a drop) to F3 (which is the third attacker entering the zone) may happen. In this case, the goalie simply adapts by moving with the puck and challenging the shooter.

6. Practice Planning

The goalie is the most neglected position in hockey during practice. Most drills are catered for improving the technical as well as tactical skills of the players while the goalie is often used as a target or just there because they have to be. The goalie's ice time is usually under utilized due to the fact that the coach simply lacks the knowledge to work with the goalie. So goalies are left with doing drills that do not help them improve their skills.

Common Mistakes

A list of common mistakes that should be avoided:

- Warming up the goalie with the same skating drills as the players.
- Multiple shot drills that do not allow the goalie time to recovery or make eye contact with the rebound or the second shot.
- Drills that do not allow the goalie to rest. Creating bad habits (check intensity)
- Drills that do not give the goalie a chance for success. (ie 3-on-0's with multiple passes)
- Scenarios that don't allow the goalie to follow the puck and maintain position. Essentially, putting the goalie in a position where he is practicing bad habits and things that you would not want him to do during a game.
- Drills that do not have game flow.

(Hockey Canada, 2011)

The Approach

- Allow 5-6 minutes of goalie skating. With or without a goalie coach.
- Warm up drills should allow the goalie time to get set follow the rebound, recover/ rest and be ready for the next shot. (Space out the players starting the drill)
- Drills that are run from both sides. Allow the goalie time to recover.
- Drills that make the goalies active. Include stick handling and puck control as well as communication.
- Explanation of the forwards and defensemen's role as well as the goalie's importance and involvement.
- Drills that have game specific situations. Ie. Battles for loose pucks in front with lots of bodies for screens and deflections.

(Hockey Canada, 2011)

In addition the coach should provide immediate feedback. A study by Carroll and Bandura (1985) on concurrent monitoring of performance and feedback found that delayed monitoring (after 100 seconds) made it harder for the learner to correct and learn a motor skill.

Phases of a practice plan

Phase 1: 10-15 minutes of Goalie Specific Skills.

Fundamental Goalie Skating Techniques. Allow the goalie time and space to do drills that help improve goalie specific skating.

Phase 2: Warm up

First drill should allow the goalie to “feel” the puck. While having time to establish and execute P.S.P. techniques. Drills that having consecutive shots should not be used. That force the goalie into practicing bad game habits.

Phase 3: Team Flow Drills.

Game like situations that keeps the goalies engaged. Maintain and practice P.S.P. techniques.

Phase 4: On Ice Feedback.

Giving specific feedback during and after each drill (and practice) positively reinforces their role. Video feedback is always a great option if that option is available.

(Hockey Canada, 2011)

Intensity

Coaches should always keep in mind the intensity of the drills when planning the practice for the goalie. The coach should follow certain rules of thumb in terms of pacing. 30 minutes of consecutive shooting drills followed by 30 minutes of non-activity is not good pacing for the goalkeeper. (Niemelä, 2012) Figure ** shows the level of intensity that the coach should take note of when planning practice.

Maintaining good habits is crucial in practice for the goalie. The proper techniques through out the P.S.P. flow through practice develops these habits. Overworking the goalie at warm-up will more than likely develop bad habits in stance, save and recovery techniques.

GOALKEEPER IN TEAM PRACTICE

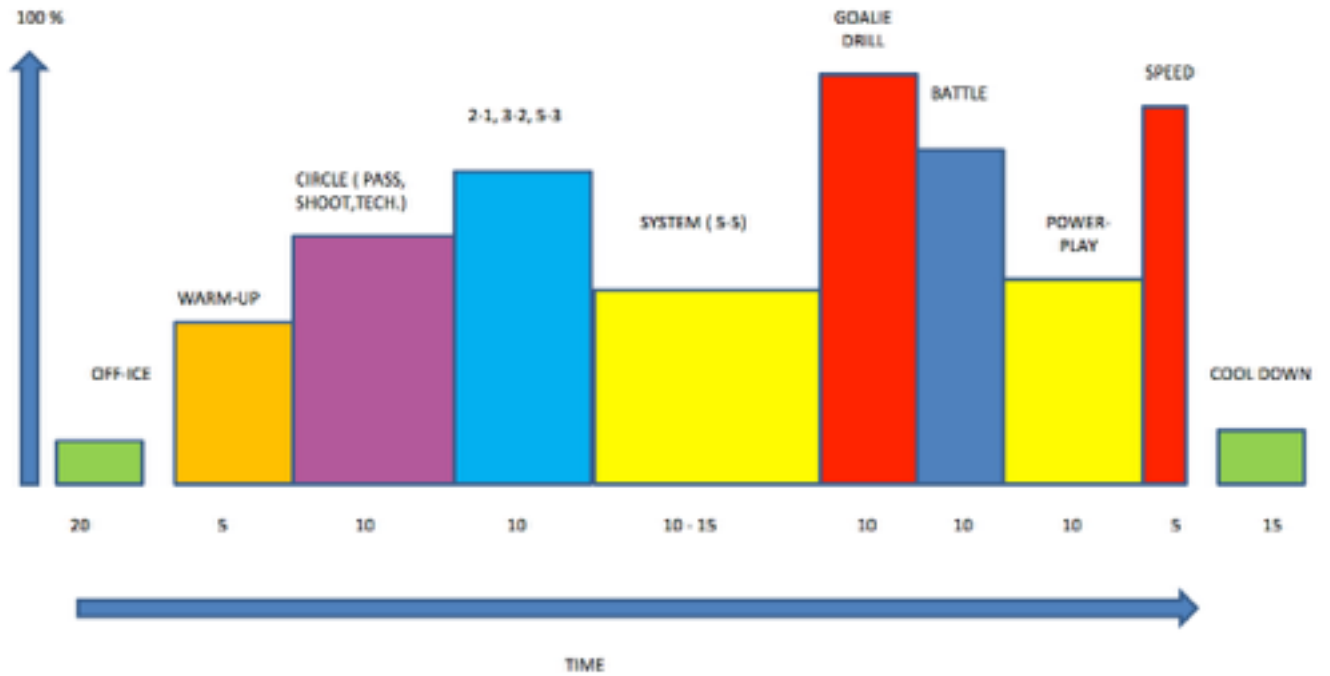


Figure 26 Goalkeeper in Team Practice. (IIHF, 2012).

7. Mental Training

The goaltender is one of the toughest positions to play in all team sports.

“Imagine a job where every time you make a mistake a red light flashes and 15,000 people stand up and cheer”-Jacques Plante.

For those who are good enough to reach an elite level that statement is very true.

Those who do not make it, it doesn't mean that there is not as much pressure because every time a goal is scored, the focus is on the goalie who did not “do his job”. There are many ways to strengthen a goalie's mind to prepare to play the game of hockey.

ABC's

There hundreds if not thousands of things that the goalie has to think about and during games and even practices. This can be very overwhelming for the goalie to try to think about them and focus at the task at hand. The goalie should simplify his thoughts and focus on the few things. The ABC's is a way for the goalie to organize his thoughts and things he wants to be aware of.

A goalie's ABC may look like this:

- A. Cover the middle of the net.
- B. Keep my pad on the ice.
- C. Stay square.
- D. Don't let shots go through me.
- E. Be aware of where the shooter is even when the play is behind the net.

(Miller, 2001)

As shown above, the ABC's do not have to end at “C” but it's recommended to keep the list as short as possible.

3 elements

There are 3 elements that the goalie needs to learn to manage. Focus, Emotional Control and Attitude.

- 1) Focus. There are many things that a goalie needs to pay attention to during the game. The play, the puck, his positioning, who his opponents and teammates are, and where they are on the ice. Must then tune out the “noise” around him that

prevents him from making a save. If a goal is scored on him (whether it's soft or not), he must be prepared to continuing playing. There are many ways to maintain focus in a game. Positive self talk, having clear ABC's and visualization. Goal setting is a good start in helping the goalie to focus. Goals can be set for a wide range of things like the season, games and even practices. Clear goals lets the goalie know the purpose of why is he doing something and he is not just going through the motions. Writing down and saying them out loud reinforces the ideas of the goals.

- 2) Emotional Control. The goalie may be in the goal for 60 minutes or more and he has to manage his emotions. Too much arousal or too little will throw the goalie's game off completely. Proper breathing techniques- release, breathe, refocus- can help the goalie control emotions.

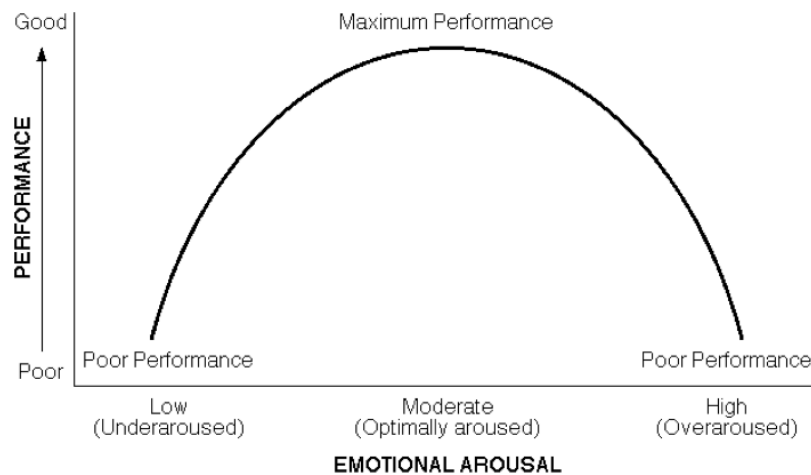


Figure 27: Yerkes and Dobson's Law: Inverted U theory of arousal that considers optimal performance relative to the performer's optimal level of arousal.

“Hockey is a game of emotions. You are scoring and winning-you feel good. You've been slashed-you get angry. You beat-you become embarrassed. You missed the net-you get down on yourself. You're uncertain-you feel anxious. You're in control-you feel confident.” (Miller, 2003)

- 3) Attitude. Maintaining a positive attitude is essential to the goalie especially during a tough game. Commitment, confidence and positive- “I am” and “I can” allows the goalie to continuing battling. A negative attitude can always lead to a “self-fulfilling" prophecy. Thinking of allowing a goal even before it helps can be distracting and may eventually result in a goal.

Imagery

Imagery or visualization is used by elite athletes in different sports as a mental rehearsal of their skills and responses during their performances. The goalie should practice mental rehearsal by performing each technique (or playing) with confidence and effectiveness. Drawing back from previous situations in which he has been successful. Start with breathing and relaxing, this will improve the quality and clarity of the imagery. Then he should see himself on the ice. Feeling good, performance each technique with ease, seeing the whole ice and controlling pucks and saves with composure and confidence. (Miller, 2003)

8. Empirical Learning

Project Planning

This project started as part of the areas of development that I was looking into during my internship with the Royal Belgian Ice Hockey Federation (RBIHF). During my stay in Belgium, I was required to look at the entire development situation within the country. While many areas needed improvement, goaltending seem to be a major area where the expertise was lacking most. Training and handling (during games) of goalies in Belgium were outdated from the club levels all the way up to the national team program.

The idea of this project was to provide goalies and their coaches an understanding at the goalie's development progression, how to train them in terms of technical and tactical skills. The project was also created so the RBIHF could use this as educational material that could be shared among the various Belgian ice hockey clubs and their coaches.

During my studies in Vierumäki, I was looking into integrating coaching educational materials and video with newer technology and mobile devices like the iPad and the iPhone. One frustration that I had with book based coaching manuals was that it was not always easy to understand what certain technics or skills meant just by reading the words or looking at pictures. One solution was to search for clarification online but I wanted something that I could get offline as well.

The first samples was an idea for a rulebook on the iPad that integrated videos in the form of an e-book. An idea that was shared with USA Hockey and received with positive feedback. The end result was a decision to “follow up” on the rulebook idea and create an interactive coaching manual that allowed the user to watch videos rather than look at pictures that may not be very meaningful.

When the idea was finalized, I started to research information on existing literature that can be found online and in the library. I was also able to get in contact with experts in the field and picked their brains combining them with some of my own experiences as a goaltender as well as an intern with the RBIHF. Work on creating the manual started.

Project Implementation

This report started with the introduction and the background of Belgium. Those things that provide information behind the writing of the report. The next step was the basics of goaltending technical skills. The goalie development model was based on several manuals and books that was researched before the start of writing. Books and manuals that included Hockey Goaltending (Brian Daccord), The Hockey Goalie’s Handbook (Jim Corsi and John Hannon), The Hockey Goalie’s complete guide (Francois Allaire), Hard-Core Hockey (Rand Pecknold), Goalie Manual for Tappara ry (Samuli Nordiman), IIHF Goalie Coach Course (Tomi Niemelä) and Essential Goaltending Beta (Steve McKichan). The philosophy in the manual was created with a mish-mash of ideas from all of these resources. The objective was to select and combine goaltending ideas from Finland, Sweden, Canada and the United States rather than focus on one particular philosophy. The report was basis of the manual was a review and recommendations that I had done on goaltending development in Belgium during my internship. The need for the manual was realized at a presentation during the 2013 IIHF Development Camp goalie course.

The second part of the report was on the background of hockey. I proceeded to doing a research on scoring. The point of researching scoring in a goalie manual report was to do some “reverse engineering”. I had an idea of how goals are scored but needed some solid statistics to backup my points. It was also to support, the ideas that were going to be mentioned later on in the manual. I wanted to let the goalies (and their coaches) know why goals are scored and what they can do to reduce the goals.

The development model was created uniquely for goalies in the Belgium. It was based on existing literature from Sports Canada about long term athlete development and adapted and use by Hockey Canada and USA hockey. As mentioned, the model was created with Belgian hockey culture in mind. Belgium did not have the same base of participation in hockey as a nation like Canada or Finland, therefore, goalies may not start playing the sport according to the chronological age listed on most manuals. So I used a model that was more age ambiguous and skill level based. This section was included to support the view that it is easier to train a goalie from an athlete than just create a goalie from scratch. Therefore, early foundational skills learned from playing multiple sports would contribute to the development of the goalie rather than early specialization.

Technical and tactical skills was the main part of the project. This is where I felt that Belgian goalies lacked most. Proper individual technical skills was lacking, therefore, holding back the potential of many Belgian born (or bred) goalies. While writing this section, I went through many of the literature (mentioned above) to get an up-to-date techniques and how to execute them. I had also gone through many videos both online and offline to review execute points. The techniques discussed were basic skills which a goalie would need to build a foundation on before moving onto other parts of the game. Some pointers were also added to give an understanding of how they can use it in a game and also with safety in mind. The tactical part of this section provide the goalie how they should deal with different situations that they faced in a game. Since the game has evolved quite a bit since I last played the position, I needed to get away from outdated information which is still prevalent within the coaching community. The main objective of this section was to show the key points in a method that was as simple as possible.

Practice plan was to help give coaches an idea of how goalies should be handled in practices. How they can plan ahead so their goalies are not just targets but involved and improving. The points were provided so the coaches can run practices even without a goalie coach. I broke down the different stages of a practice and how the goalie should be utilized in each phase. There are many common mistakes handling a goalie at practice and they were addressed which included the intensity of the practice which the goalie should go through to avoid developing bad habits.

Mental training was a topic that was covered by a few of the manuals that I reviewed. This part of the thesis looked at developing a mental game plan for the goalie. The focus first was to teach goal set for the goalie with the ABC's exercise. It gave the goalie mental notes on what he should be focusing on during a game. The list was kept to as short as three to keep things simple. The three elements was also discussed in the thesis. Focus, Emotional control, and Attitude were things that the goalie needed to learn to manage. Lastly, was a short introduction on Imagery. A mental rehearsal that is used by many athletes from different sports. The goalie would draw from previous experiences and situations and imagining himself in those positive situations.

The creation of the interactive manual was next. It took a bit of planning to create this manual because there were a few components in the manual. First, videos need to be shot. First a script needed to be written so we were able to know what type of shots that we wanted and can achieve. It was made slightly easier by the list of skills that were already done as part of the thesis. Within each skill and video, it had to be decided what and how many angles would be used to capture the demonstration of the skill fully. There were also logistical issues to planning the shooting. Which type of camera was available for use? Where would we be able to get the goalie(s) and players to demonstrate the skills and drills? The camera issue was solved with a trip to the hockey centre and a camera was borrowed for the shoot. An iPad was also used in the shooting. Next was the issue of the players and goalies, a suggestion to use the local Vierumäki A junior club was taken. The shooting was coordinated with the head coach and drills were incorporated into their practice plans. It lasted roughly two hours with one of the goalies staying back to filming some of the individual close up shots. A re-shoot was set up for the next day to make up shots that were missed on the first day.

The filming was considered the most tedious part of the process. The next step after that was to edit and select the shoots that were taken. This was done was the iMovie app. The software allowed clipping of videos and adding graphics on top of the selected videos. Each video component in the manual was a compilation of different shots taken during the shoot. They were "sewn" together and key points highlighted in text graphics. A collection of 35 videos created for this project.

Next was creating the manual. The manual was done on the ibook author app. The software was created for ease of use. Anyone who has experience with powerpoint or word processing would be able to pick up the use of this application very easily. Many build in functions also made it simple to create interactivity in the manual. Within the manual, interactive widgets included media (video), picture gallery, interactive pictures with pop up pointers. The keynote widget in the ibook author software allowed more interaction in the form of the Belgium goalie development model. The model was built using Keynotes (a powerpoint-like software) and imported into the manual. Those were the important parts of the manual which set it apart from other coaching manuals. The content of the manual was transferred largely from this thesis. The manual integrated written information and interactive widgets (with the aim) to help the user understand the skills better.

Project assessment

The end result of this was a 53-page manual in four chapters. They were separated into Goalie Development (Athlete Development, Technical vs Tactical Skills, Pre-Save. Save. Post-Save.), Technical Skills (Basic Stance, Skating, Pad Saves, Trapper/Blocker, Stick Saves, Puck Control, Positioning, Shot Location), Tactical Skills (Individual Tactics, Odd Man Attacks), Coaching the goalie (Practice Planning).

I was please with the outcome of the product. Initially, I thought I could cover everything that a goalie needed to play the position. At the same time, I wanted to make the manual as simple and as user friendly as possible. It was difficult to streamline the information and make it meaningful without leaving out important information. Ultimately, I felt that it was a manual that addressed the pressing issues that goalies and goalie coaches in Belgium need to address.

The goalies and coaches (alike) in Belgium will be able to gain information about what the goalie needs in order to improve his skates and reach their goals in the sport. The skills discussed in the manual will provide a strong foundation for the goalie to build his game. This manual is not to instil any forms or styles of goaltending, rather it has combined the thinking of goalie coaches from different “goalie factories” around the world.

Discussion

The objective of the manual was to provide knowledge about skills needed to play the goaltender position in the sport of hockey. The skills discussed in the manual are technical, tactical and also a look into practice planning for coaches and into the mental aspect of the position. The manual was designed to be interactive so the goalie and/or his coach is able to understand the content not just through words but also visuals.

I felt that I was able to create a manual that I had envisioned awhile back. During the process of creating this manual, it opened up my eyes to many other opportunities that this could lead to. In terms, of progression of how coaching manuals are created and importance of incorporating technology in teaching and coaching. Gone maybe the days of plain text and diagrams that may mean very little to the learner.

From a hockey stand point, I was able to refresh certain points that were forgotten after years of inactivity as a goalie. I was able to open up debates about the evolution of the position and the use and teaching of certain skills that may be deemed redundant in this age of goaltending.

The biggest challenges that I had were in the initial planning stages. There were definitely a whole lot of material out in the market and the internet opened it up even wider. Some material was also deemed outdated for today's goaltenders. For example, a video with former NHL great Ed Giacomin could not be referenced or used because the techniques discussed in it, was just simply outdated. Lack of material was not the problem, it was deciding what was to be kept and what was to be thrown up. This process went on even to the final days for finalizing the manual.

My time in Belgium gave me an insight look at the obstacles and needs of a Belgian goalie learning to play the position. The manual was created to allow them to understand what they need to correct and what basic skills they need to build on in order to become a successful goalie. I was satisfied by the outcome of the project. The manual should help the goalie and his coach understand the position better.

Creating this manual gave me new insights. The time and work that went into it gave me better appreciation for the goaltending position and coaching the goalie. Part of the idea of creating a manual like this was that it allowed updating of information.

Progression and attitude were two important things that I got from doing this project. There is always a need for me to tweak and make this manual better. Attitude would be the driving force behind it or it could hinder your progress. In the words of Mike Babcock, "You choose your attitude." Reaching your goals can get really tough at times but you get to choose how you want to handle it. You can choose to fold or you can choose to dig in until you get to your goals.

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