



My Development as a Physical Trainer From the Perspective of Injury-Preventing Training and Year-Round Physical Development

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Abstract

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<p>The purpose of this thesis was to examine the author's professional development as a physical trainer in the Pelicans U-18 hockey team. The work was a 12-week long process, of which during the eight-week period the author filled a daily diary about his actions. In longer weekly analyses he reflected his actions from perspective of his professional development.</p> <p>The aim was to examine professional development within the framework of injury-preventing training and year-round development of physical characteristics. The author's goal was to achieve professional development within the framework of the main topics of the thesis, and to find out and show the challenges of professional development as a physical trainer during the regular season in an ice-hockey team.</p> <p>The introduction of the thesis included a brief description of the author's current work, tasks and work environment. The introduction also included a theoretical knowledge base, which the author used to justify his choices and which the author used to help his professional development. The second part of the work consisted of analysing the initial situation and stakeholders. The second part also included the analysis of the skills needed in coaching within the framework of the topics, as well as the evaluation of the coach's interaction situations in the form of stakeholder groups.</p> <p>Main part of the work was writing diary entries and weekly analyses during the eight-week follow-up period. The diary entries worked as a supportive source for weekly analyses, in which the coach's weekly professional development was reviewed extensively from the perspective of activities that prevent injuries and activities that support year-round physical development.</p> <p>In the discussion section of the work, the author came up with conclusions about his own professional development during the work. The conclusions stated that eight weeks to review professional development is a relatively short time but observing one's own work brought up fundamental challenges related to the training process repeatedly during the weeks. Combining off-ice training with ice training and monitoring recovery in a changing weekly rhythm were recurring themes that caused challenges. In author opinion monitoring the recovery requires measures in the future. Author was able to gain professional development when he learned to consider challenging issues in the training process, and practical actions were taken to improve them. Professional development came also on a form of self-confidence through authors discussions with peer groups during the work and researching the knowledge base since those things highlighted that the content of practice within the framework of this thesis is beneficial in terms of physical development and injury prevention.</p>
Keywords Coach Development, Physical Training, Injury Prevention, Sport Coaching

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1 Introduction

My diary-based thesis goes through my professional development as a coach and methods of operation in my daily work in Junior Pelicans Ry's U18 team. The main point during the eight-week (August 28, 2023-October 20, 2023) follow-up period is to review and reflect on my own development and what I have done as a coach from the perspective of injury-preventing training, as well as physical training that serves athletes year-round development. During the eight follow-up weeks, I will write briefly about my work tasks every day, and each week a longer analysis of my weekly development, challenges and thoughts that came along with my work tasks.

Junior Pelicans Ry is a hockey club from Päijät-Häme region, which was founded on April 20, 2016. All ice hockey clubs in Päijät-Häme serve as founding members: Kiekkoreipas ry, Heinolan Kiekko ry, Nastolan Kiekko juniorit ry, Pelicans 2000 Hollola ry, Kanavan Pallo -80 ry and Vekin tuki ry. These founding clubs continue to operate as local agents, supporting the activities of JuniorPelicans in their own region. The whole club has a total of 70 teams and there are about 1300 players in the club. Teams operate in all age groups at many levels, from U-8 to U-18 teams, including a hockey school for the youngest children. (Junior-Pelicans ry) Lahden Pelicans OY also works in close cooperation with the club, under which the U-20 and men's Liiga-teams operate.

I mainly work as a coach for Junior Pelicans ry's U-18 SM team. My coaching duties mainly include planning, scheduling and leading the team's off-ice physical training. My areas of responsibility also include the role of assistant coach in ice training, as well as planning and implementing exercises related to the defenders' playing position. I have also been given a lot of responsibility for coaching the team's penalty kill, and during game events I lead the team's penalty kill meetings using video examples. I also work once a week in the morning training activities of high school students in the role of assistant coach. Weekly I am in contact with about 30-40 athletes who belong to the organization's U-18 or U-20 teams. In addition to this, I am in close cooperation with three other coaches of the U18 team, the physical trainers of the U-20 and Liiga team, and the head of the club's coaching.

My main task is to help the players in their physical development, as well as to help them stay in shape all year round. I spend most of my working time planning and implementing physical training, and that is why I have chosen the topic of this thesis from the perspective of physical training and injury prevention training. From this point of view of physical development, a

coach needs certain skills in his daily work. It is important to understand the physical requirements of the sport, as well as the methods of operation that can be used to develop the necessary physical characteristics. It is also important to consider the overall process leading to year-round physical development, which includes the right periodization of training, and the balance between training and recovery. Nutrition also affects this whole. From the point of view of training to prevent injuries, the coach should have knowledge about most injury-prone places in terms of the sport, as well as the physical demands of the sport. It is also important to internalize the origin and nature of the most common injuries in the sport, so that training can be programmed.

I have chosen sources from literature which consider physical training and development. High-performance training for sports, written by David Joyce, Daniel Lewindon and Mark Verstegen (2014), is an information-rich work from the point of view of year-round developmental training, where you can find information from longer-term planning to the content of a single training session. From the point of view of injury prevention training, the search for information was more extensive, but *Sport injuries: Prevention, Treatment and Rehabilitation*, written by Lars Peterson and Per A.F.H. Renstrom (2016), is a good information package about the most common sport-specific injuries and the ways in which injuries occur and prevention methods. The entirety of the training process and issues leading to possible injuries in the longer term were also examined in *Sport, Recovery and Performance: Interdisciplinary Insight* by Michael Kellmann and Jürgen Beckmann (2017), which was also used as one of my main sources.

2 Description of the initial situation

2.1 Analysis of my current work tasks

In the Pelicans U-18 team, my duties include several different coaching-related tasks from a wide range of fronts. According to the structure of the team and the club, coaches have not been recruited only as physical coaches, for example, with the exception of the men's Liiga team, which means that the team's assistant coach is in many cases also responsible for other aspects related to teams' functions. In my case, I act as the assistant coach, and I am also responsible for the physical training (off-ice training) of the team's players off the ice. Due to the nature and topic of my thesis, it is appropriate to go into more detail specifically about my tasks dealing with physical off-ice training and development.

As the operator responsible for the physical training of the ice hockey team, my duties include planning physical off-ice training during the ice hockey season, from the season level to the content of individual training events. Seasonal planning always takes place in the spring before the start of the new season. These planning events usually involve coaches from the club's various teams, and these sessions are led by the club's head of coaching and the Liiga team's physical trainer. In the meetings, the main lines of physical training, as well as the needs of the upcoming season and the existing strengths are discussed on a team-by-team basis. In these meetings, the basic guidelines for physical training at the club level are also reviewed, which are largely based on the guidelines put forward by Harri Hakkarainen (2012, 2014). Considering this there is still some freedom in planning of training and there could be aspects in training process brought by teams own physical trainers. Nevertheless, these actions should always be reasoned. The periodization and emphasis of training during the season is planned for each team by teams 'own physical trainer in cooperation with the Liiga teams physical trainer and the head coach of each team. In my case with head coach of U-18 team. I am responsible to make initial plans and after I have done it, the plans are reviewed with the physical trainer of the Liiga team, who acts as a kind of mentor for the other physical trainers of the club. At the organizational level, I think the support for physical training is successful, because each training period (block) is reviewed in a professional environment, and the necessary changes to the plans can be made.

On a weekly and daily basis, my task is to plan the topics and contents of the physical off-ice training. One big value in planning weekly physical off-ice training sessions is that they should

fit together with ice training according to Hakkarainen's (2014, 2012) model which mostly acts as a framework of the clubs physical training. The purpose is that in physical off-ice training, during the same day, qualities are practiced that serve the physical qualities emphasized in on-ice training on the same day as efficiently as possible.

In terms of injury prevention and physical development, my job is also to train and develop players to manage these issues outside of training. This means taking nutrition lectures, monitoring nutrition, and optimizing and monitoring recovery. I monitor physical development in cooperation with other coaches of my team by producing physical tests at least three times during the season. The desired tests are also possible at team levels to be carried out more often. In order for physical training to be optimal, my task is also to produce content for various strength, speed and injury prevention exercises in a way that enables development and at the same time serves ice training and the sport. In these matters, the club's network of other coaches also help each other.

I have obtained the information required for planning physical off-ice training based on my own education, in Haaga-Helia's studies focused on professional coaching, the process of physical training in team sports is discussed extensively. Within our organization, other physical trainers also help with the timing of training and content production, of which the Liiga team's physical coaching professionals mentor others at regular intervals, these meetings are about four times a year and more often if asked. Especially in the production of training content that prevents injuries, this help from other coaches is very useful. This way, you can get more exercises and you can vary them in a suitable way. The skating and skills coach of the Liiga team also provides the junior team coaches with activation and mobilization movements for the muscles needed in skating, which can be combined with their own already prepared exercises. In addition to external sources, I have also gained a lot of knowledge from my own motivation to research effective training methods and movements for training. For example, the works *Strength and Conditioning for Team Sports : Sport-Specific Physical Preparation for High Performance* (2012) by Paul Gamble and *High-Performance Training For Sports* (2014) by David Joyce, Daniel Lewindon & Mark Verstegen, which I used as a source in this work, are served as personal sources for my knowledge even before starting my actual thesis. In addition to that, the internet and the experience gained during my own sports career have served as a wide source of information, but this information -like from any source- must be filtered and interpreted critically.

In order to be able to structure the whole physical off-ice training process sensibly for the entire season, information is needed on what the physical requirements of the sport are, and how the

training process works as a whole during the ice training during the season and during game events. Training must be programmed to serve the sport as well as possible, and to motivate the athletes. Programming also needs mapping and information about the athletes' physical condition, and how to make training effective and safe for individuals of different levels. In injury prevention training, on the other hand, the most common hockey-related injuries and their nature must be known. Physical trainer must understand which injuries can be avoided by training, and which cannot. In terms of injury prevention, physical development, recovery and other life management skills need to be monitored, and this is a task that requires resources. On a personal level, I feel that the biggest challenges arise from monitoring an individual within a team. Exercises can be created for many different purposes, but the level of physical maturity of individuals may vary a lot biologically in the U-18 age group. This is why some exercises are better for some than others, and some may not benefit from practicing certain things at all. Another challenge for me is monitoring the recovery of individuals and taking it into account in training. Monitoring recovery effectively is a very complex process, but at the same time it would be important to implement it. In addition to monitoring recovery from the point of view of injury prevention and continuous development, I also hope to gain more knowledge about the most common injury mechanisms and injuries that can be avoided by training. The production of content for injury prevention training is also challenging in terms of time resources. In the limited training time, we want to find effective, but versatile exercises.

I feel that I understand the planning of team-level training, and I have been able to thoughtfully produce developing and sport-specific content for the players, I also understand well the biomechanics of individual movements, training techniques and can show model performances in practice if necessary. In this sense, I am a skilled performer as a coach. My challenges are in taking the individual into account and modifying the exercises to better suit the individual's needs. This also applies to injury prevention training. It would be good to have sufficient variety in the content, and it would be good to find enough time even in busy weeks for injury-preventing training. As a measure to prevent injuries, I also mention the already mentioned monitoring of recovery, which I have knowledge of in theory, but the practical implementation is challenging.

2.2 Stakeholders

I have divided the stakeholders related to my physical off-ice training work into internal and external stakeholders based on how much the groups or individuals affect my work on a daily or

weekly basis. The number of contacts during the season between me and different groups also affects this breakdown. (Figure 1.)

People belonging to internal stakeholders are in contact with me weekly or daily. They are involved in the evaluation of my work and influence my decisions about the content of the internship. As a whole, the activities of these people shape the training process with me throughout the season, and their interests affect the implementation of the training on a practical level and even in a relatively short term.

The most important internal stakeholders in my work are the other coaches of the Pelicans U-18 team, especially the head coach, because I am in daily contact with them, and the team's training process on and off the ice is practically planned with this group. The head coach's opinions on the implementation of ice training, as well as suggestions regarding physical training, directly affect my own planning and the content of physical training. Other coaches are often helping me in leading physical exercises and giving examples to the athletes according to my instructions.

Another important internal stakeholder group in my work are athletes. For their development, physical training is done and planned, and their development and staying healthy is a mirror of the success of physical training. At the same time, they also act as feedback providers for me, and the response from the training affects the planning of future physical training.

I am also in contact with other physical trainers from U-16 team and U-20 team every week, and we discuss a lot of questions related to physical training with them. Thoughts and practical contents can be shared in mutual discussions, and feedback can be given both ways. The physical trainer of the Liiga team also goes through my periodic plans and shares his own feedback. He is also always available if I need help with something related to physical training. This group also includes the skill and skating coach of the Pelicans organization, with whom I meet weekly, and he shares a lot of ideas and material for physical training from the perspective of skating and injury prevention. Since these people have a direct opportunity to influence my work, the other physical trainers I deal with are also an internal stakeholder.

External stakeholders include, for example, the club's management. Hiring and recruiting of coaches is handled by the chief of juniors and the head of coaching in Junior Pelicans. I discuss about my work with the head coach about twice during the season, but in those meetings, we also cover other aspects of coaching. In terms of physical training and development he does not practically affect my daily or weekly work. I talk with him more about coaching as a whole outside of physical coaching.

At the level of the entire organization, other coaches are an external stakeholder in my work. I produce material that may occasionally be used, for example, in educational sessions where physical training is reviewed for the coaching teams of younger junior teams. Otherwise, contacts with coaches who coach younger than U-16 age group are sporadic.

Outside the club environment Finnish ice-hockey association (FIHA) must be considered as one external stakeholder related to my work, because people over there are responsible for creating the game schedules during the regular season, which has essential effect to my team's weekly training rhythm off the ice and on the ice.

As the last external stakeholder related to my work, I consider the parents and other supporters of the players. They enable the players to move to practice, as well as their nutrition and recovery outside practice and game events. Year-round development and injury prevention activities include comprehensive life management, and the parents of the players are partly responsible for this, in addition to the coaches and the players themselves.

In order to clarify the structure, I have pieced up together the figure (1) below, in which the different stakeholders have been broken down, and the coach is in the centre.

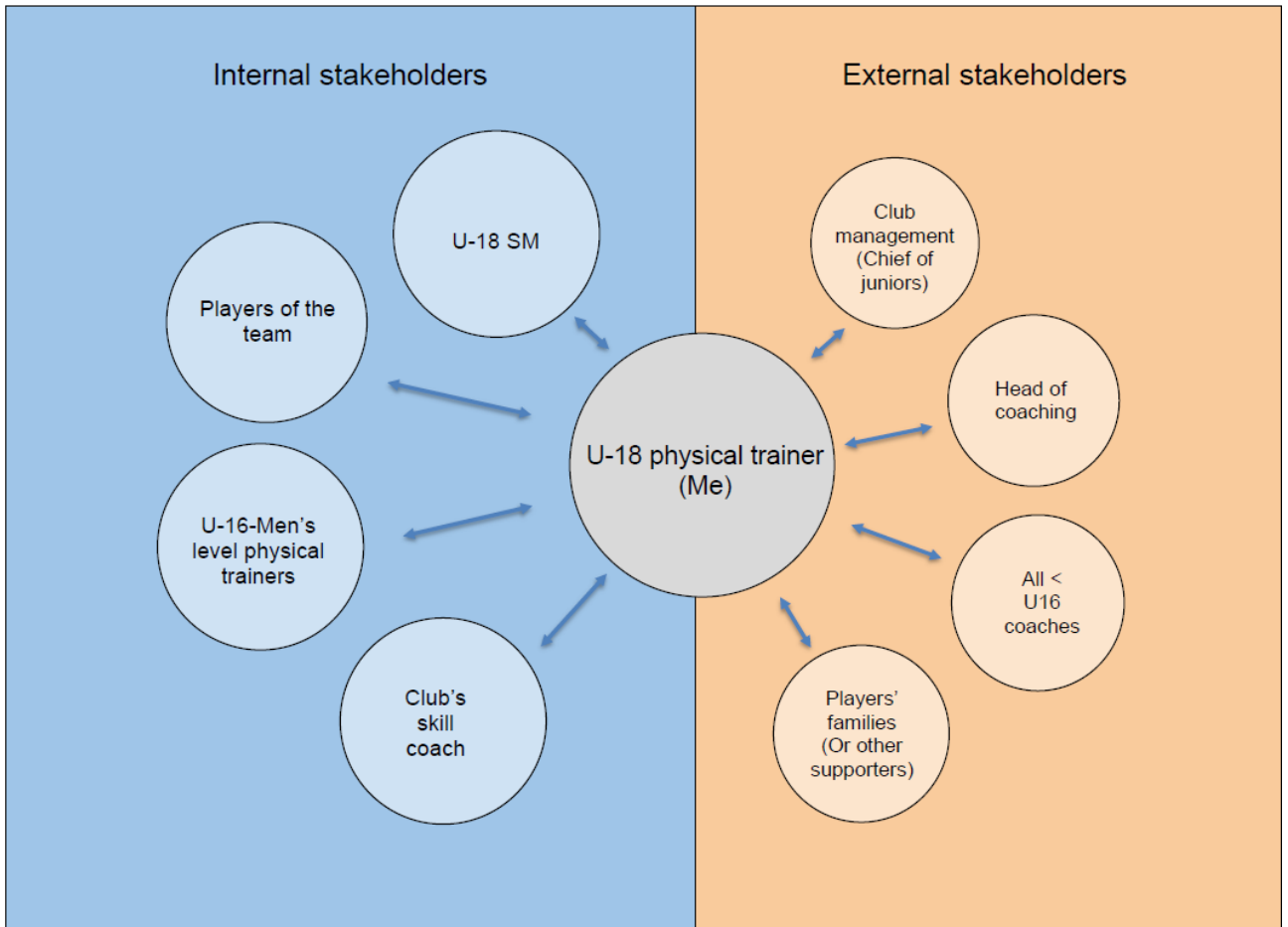


Figure 1. Interest groups

2.3 Interaction situations

I think I am in a fortunate situation in the sense that communication with my coaching colleagues is very open and always goes in two-ways. They are one of the most important stakeholders related to my work, and I've known each of them for at least the last two years, so talking to them is relatively easy. Communication with the players is also easy in the sense that I have coached almost all of them in previous seasons, with a few exceptions.

Together with the other coaches of the U-18 team, I examine questions related to the structure and periodization of physical training. Questions that come up every week are, for example, how we can make ice training and physical training serve each other as well as possible. With other physical trainers, we discuss ideas related to the contents of physical exercises. The physical trainer of the Liiga team mainly acts as a mentor for me and other physical trainers.

He gives suggestions for periodization and training content in joint or individual meetings. Periodic plans are also always discussed with him. The content of injury-preventing training and its placement in training are also heavily reviewed among the physical trainers. Ideas arising from these discussions can be incorporated into the weekly team program.

The challenge with players comes from the one-sidedness of communication at times. I give them a lot of material and advice in everyday life, and they try to do things to the best of their ability. A large part of communication is going through the content of physical training -what, why and how-. Demonstration of content and feedback on performance are also part of this communication. As a person, I am open to discussion and I like to justify the things that have been done, but often a two-way conversation between the players and the coach does not occur, unless I specifically ask the players about things. For example, the success and appropriateness of physical training would be a great topic to discuss with the players more often, but these initiatives come from the players very rarely, although they are encouraged to ask and question if they feel like it. I feel that some of the players have also improved in this regard. This greatly facilitates monitoring the player's development and motivation. As a physical trainer, part of the communication with the players is also teaching principles related to overall development. In addition to optimal training, these include issues related to the athlete's nutrition, as well as issues related to recovery. This entity enables development (Joyce, Lewindon & Verstegen 2014, 304.)

Discussions with persons related to secondary stakeholders are more extensive and deal with entities related to coaching. The head of coaching is present in the meetings related to physical training held in the early season, where the broad lines of physical training are discussed at the club and team level. Communication with people (families, etc.) related to the players' supporters is mainly one-way. The material is transferred from me to the players, and through them indirectly to home. In some cases (for example, a nutrition lecture Power point presentation) the material is also sent to the players' parents for review.

I feel that the biggest challenges in interaction situations arise with the players. Intermittent one-sided communication on the part of the coach leads to the fact that it may be difficult to know and observe the player's physical and mental situation. I think that the occasional lack of concentration in training could be at least partially solved with better communication on the part of both the coach and the players. This can be seen on a practical level, for example, as a variable performance quality in injury-preventing exercises. For this reason, I would like to make the players understand even better the purpose and importance of certain things for development and staying in shape. If there is no understanding, I would hope that the players would

dare to question the things done out loud, in which case I would be happy to justify the actions taken. In this case, from my side, I see the clarity and purposefulness of communication as a challenge and development target.

3 Diary entries

3.1 Observation week 1

Monday 28th august 2023

After the weekend games, Monday usually serves as a recovery day, and the ice practice is kept physically a little lighter because of this. On the ice, mostly skill-based exercises and goal-scoring were practiced. Battling situations was kept to a minimum.

Deviating from the normal rhythm, the off-ice exercise was still an upper-body-focused strength exercise, which included a warm-up section before the strength exercise, as well as a second warm-up section for the legs after the strength exercise for the ice. With this, the risk of injury to the hips and other key muscle groups needed on the ice was reduced and readiness to train was increased.

Tuesday 29th august 2023

Tuesday was a day of strength and battling, according to the weekly rhythm. The off-ice training included a good initial warm-up, which prepared the players for the physical training in the gym and at the same time for the on-ice training after the physical training. The main themes of the warm-up were warming up and preparing the muscles in the hip area, as well as warming up and activating the calf and ankle area. Warming up on gym training days always also includes its own phase for warming up and activating the middle body.

The ice training included a lot of battling-related exercises for the whole team, as well as defenders and attackers for small groups. On Tuesdays, the training always includes exercises performed at the five vs. five level according to the theme of the respective training week.

The practice did not go well, and the coaching felt that the defensive play throughout the ice practice was reluctant and lazy. The spoken word did not work for the players, and it was decided to stop the ice practice a little before the actual end time. In the locker room, the whole team discussed the matter.

Wednesday 30th august 2023

Wednesday was a day of two practices. In the morning, the players had a morning practice, the subject of which is always skill-based. In the mornings, the topic of practice is currently shooting, attached to different game situations depending on the game position for players.

The players warm up on the ice in the morning is done independently, and the themes in the practice sessions are not always related to the team's evening practices.

In the evening, during the team's training, the theme of off-ice practice was lower body maintenance and restorative aerobic exercise. The aerobic section was done by jogging, and the main themes of the maintenance section were strengthening and mobility exercises for the muscles in the pelvic area. A large part of maintenance exercises are done focusing on the hip area and other muscle groups needed in ice hockey such as glutes, ankle area, thighs and lower back area, as they are exposed to the greatest stress.

Friday 1st September 2023

Friday served as a preparation day for the first regular season games. The theme of the exercise was the development and repetition of the defensive game in the defensive area. Due to the shortness of the ice practice, the focus of the game was covered only with the help of a familiar practice at the five-man level. The ice practice preparing for the game also included (as almost always) powerplay and penalty kill training, as well as a short period small area game at the end.

On the ice, the focus is also on creating a relaxed and motivating atmosphere, so that preparation for the game would be optimal.

The physical training before the ice training consisted of a warm-up part and speed training. Speed exercises were done by running on stairs and jumping, as well as with short period-change of direction type runs. This reduced the amount of strain on the muscles of the pelvic area, such as the hip flexors, and reduced the amount of shocks to the knees, ankles and back.

Saturday 2nd September 2023

Saturday was the starting day of the actual league games. In addition to the head coach's opening meeting, the day also included a meeting about understrength led by me, and a meeting about superiority led by another assistant coach.

In all meetings, the main point was the same for this day: activity, workload, and the feeling of accomplishment were in the center.

As a result of several absences, coaching also had to emphasize the use of reason in terms of energy consumption. We only had four defenders in our formation instead of the usual seven, but the attacking fields were normal.

In addition to the game, the currently injured players completed an aerobic and rehabilitation exercise for the day. There was also one new injury during the game. It was a blow injury to the middle of the thigh, which has a short recovery prognosis.

Sunday 3rd September 2023

Sunday's game was played in Turku. The opponent was a team that skated well, and the tempo of the game was fast. We got three defenders returning to the lineup, who had previously been at the Pohjola camp pre-camp event. Because of this, playing defenders was easier and more effective.

As a result, we played a good game again. In our own area, the defense was at a good level, and the offensive game from counter-attacks and puck possessions worked well. The result was a 0-4 victory.

After the game, the focus from a physical point of view was a good final warm-up and as big a dinner as possible, so that the recovery can be started quickly. The next training week starts already on Monday, and the next rest day will not be until the following Wednesday. Dynamic mobility and strength exercises, especially in the hip area, are commonly used by all players.

weekly analysis 1.

I think that the opening week of the regular season for the team was focused, but still relaxed. There was generally a good atmosphere within the team in on- and off ice practice, even though Tuesday's ice practice was halted mid practice due to the head coach's decision.

From the point of view of physical training and development, regular season games did not bring major changes to our teams program. During the first observation week I think that my main development was actually putting more focus on physical side of things inside our practice. This was mainly because I knew that I started my thesis observations and I wanted to put focus in the topics which I'm covering during observation period. Focusing more in physical training aspects as a part of U-18 teams process actually made me think a lot of different things related to my professional development and topics of this thesis.

First I considered our physical training process as a whole. Harri Hakkarainen has brought to Pelicans a thinking model regarding training, according to which we strive to follow year-round development for players in physical training, as well as to maintain every characteristic required in the sport (Hakkarainen 2014). According to Hakkarainen (2012, 4-5) we try to emphasize the selected characteristic to be developed in training twice a week in cycles of about 4 weeks, other characteristics are constantly maintained. Speed, strength, mobility and aerobics are included in each training week and also in individual training, but the emphasis on the characteristics changes depending on the qualities being trained. During the regular season, we try to take even better into account the themes of the ice practices, which we combine with the ice practices as best as possible within the framework of our resources. This is one area in my professional development that I paid attention through my thinking this week. Sometimes combining physical training and ice training is challenging due to the changing weekly rhythms and emphasis, but the coach must also understand that comprehensive hockey training is sometimes a compromise between physical training and ice training. This means that the physical trainer must be in constant close contact with the head coach responsible for the team's ice training, so that a sufficient amount of the desired physical stimulus can be obtained through sport training and physical training. The accumulation of fatigue must be taken into account in this situation. (Joyce, Lewindon & Verstegen 2014, 301-302.)

One other issue related to my professional development was weekly development and off-ice training process. Physical training should not be feared despite the start of regular season games (Hakkarainen 2012, 4). Despite the thought of developing physical characteristics through whole season, regular season games nevertheless bring the idea to the coach that the players' performance should be optimized for the games. After all winning games is of great value to our team in competitive sports. This means that one of my weekly tasks is to create an environment for developing physical training, but at the same time to optimize the players' performance for games. Internalizing this idea in training and conveying it to the players is also one of the subjects of my professional learning.

Third area of development I started to focus was Injury prevention training, which is another topic of my professional development during this monitoring period. When I'm thinking about optimal performance at the team level, we also want as many players as possible to be physically able to play. This means that also injury prevention training is an important part of our weekly training cycle. At the team level, we try to prevent player injuries by always doing a good warm-up in training and in games. We use Jeffreys (2010) RAMP model to warm up, which has been found to be good for improving performance and preventing injuries by warming up and preparing the neuromuscular system for performance. RAMP is an acronym used to describe a different objectives of warm-up with respect to performance. In this acronym R stands for raise phase, A stand for activation phase, M stands for mobilisation phase and P stands for potentiation phase. (Gamble 2011, 126.)

The RAMP-type warm-up we use works well in preparing body for the upcoming session as well as for developing the qualities needed in the sport, both in the short term and in the long term. The RAMP warm-up consists of four different phases, which lead to each other, and whose tasks are, according to their initials: 1. To raise the body temperature, 2. To activate and 3. To mobilize the necessary muscle groups, and 4. to enhance the body's activity for the actual performance by increasing the intensity and increasing the stress of the activity in preparation as a guarantee. (Figure 2.)

R.A.M.P Warm-Up Protocol – Jeffreys (2007)	
RAISE Low intensity activities, often aimed at developing movement patterns.	Raises: Body Temperature, Heart Rate, Blood Flow, Respiration Rate, Joint Fluid Viscosity
ACTIVATE Often involves 'prehab' associated exercises to activate key muscle groups e.g hips & shoulders via: ->	Activation: Mini-Band Drills, Glute Bridges, Overhead Squads, Rotator Cuff Exercises
MOBILISE Mobilise key joints & ranges of motion used in the sport through dynamic movements	Mobilisation: Focus is on movement. Movement Specificity Mobility & Stability
POTENTIATION Activities that improve the effectiveness of subsequent performance	Potentiation: Raise Intensity & Excitation Post-Activation Potentiation (PAP) Enhance Strength/Power - Performance

Figure 2. The R.A.M.P protocol for structuring a warm-up by Ian Jeffreys (Adapted from Science for sports 2019)

The RAMP-type warm-up also works well from the point of view of saving time. It is possible to implement it in such a way that the movement patterns needed in the sport (i.e. the main performance) can be used and practiced. In this way, we get much more repetitions for the performance of the desired movement patterns on a weekly basis.

In connection with the warm-ups, we can also add for example short mobility sections to the exercises, which are otherwise practiced in independent maintenance exercises every week. In connection with the strength exercises performed in the gym and in the warm-ups performed before them, there are always exercises that support a good posture and strengthen the core. This is mainly to save time and to prevent injuries in strength exercise as well as sport specific movements. In this way, we can make better use of the limited time we spend each week in training. In the coming weeks, one of the important development targets for me is to find optimal ways to implement injury prevention training as part of other training with

limited time resources, because the U18 training schedules in Lahti are sometimes challenging. We often practice late at night. The evening's ice practice may end at 9:00 p.m., for example, and the next morning's practice starts at 7:30 a.m. In this case, there is only a short period of time for rest and recovery between training sessions, which makes extra injury-preventive training difficult to organize after team training.

Peterson and Renstrom (2016, 122-125) suggests that about 15% of injuries in ice hockey happens because of overuse. Due to the biomechanical nature of the sport and the nature of the competition, especially in the groin and hip area, injuries occur relatively easily as a result of overuse. Joyce et al. (2014, 313) also suggests that the hockey player is often in flexed positions for extended periods of time, from which quick changes of direction and sprints are performed. In this case, strong legs and robustness of the lower back and hip area are essential. This is why the main part of Pelicans U-18 teams maintenance training is strengthening the muscles in the pelvic and core, such as the hip flexors and adductors, with the help of rubber bands and other exercises. Sprains and strains of the muscles in the hip area are one of the more common overuse injuries that occur in hockey, which can be helped with good training (Peterson & Rentsrom 2016, 124). Ice hockey players usually have strong buttocks and hamstrings, but the muscles on the other side, i.e. hip flexors, adductors and hamstrings, are relatively weak. This causes a muscle imbalance that may show up in the skating kick as a sprain or tear in the adductor or hip flexor. (Tang 6 June 2018.) Players often do not understand this cause-and-effect relationship, and continue to do unilateral strength training until injury. As a coach, my responsibility is to raise the importance of injury prevention training very clearly to the awareness of the players.

Besides extensive thinking process of different aspects of the teams physical training, I did not do any practical changes in contents which consider U-18 teams year around physical development or injury prevention training. To help myself for the upcoming weeks, I used the first week mainly on analysing the current situation.

3.2 Observation week 2

Monday 4th September 2023

On Monday, there was a skill-based ice practice in the evening according to the weekly rhythm. After the weekend's heavy games, the accompanying training was also necessary, as the physical load on the muscles related to skating was high. Overall, Monday was a light day in terms of stress.

Strengthening rubber band exercises were performed on the hip area to strengthen the hip flexors and adductors, as well as to activate glutes. In connection with this, strengthening and mobility exercises related to hip rotation were also performed. The muscles of the lower body as a whole, as well as the back area and front shoulders were also worked through with dynamic stretches.

After a maintenance section a few more sprints were taken on the stairs to activate the nervous system.

The ice practice itself focused on goal scoring skills, as well as passing and faking a pass from skating.

In connection with the training, the coaching staff also had personal discussions with the two players who were injured during the weekend. One had a broken arm, so the rehabilitation is carried out according to the doctor's instructions, and the other had a blow injury in the middle of the front thigh. For the time being, the player who injured his front thigh is doing light training by pedalling the fitbike, walking and using a foam roller in order to get the fluid accumulated in the tissue moving.

Tuesday 5th September 2023

Tuesday was the only strength training day of the week besides the ice training. Because of the games, there are often small changes to the weekly rhythm, but at that stage the coaches must know how to adjust the plans. Strength training was done for the whole body. In the initial warm-up, a lot of control and balance movements were done for the whole body, so that the body is ready for gym training. We often prefer one-legged movements in gym

exercises, because hockey as a sport requires control and the ability to generate power from one leg on the ice. As a balance, two-legged movements are also done in the gym, so that the desired characteristic (speed, hypertrophy, maximum strength etc.) can still be developed as efficiently as possible.

In the ice practice, the topic was offensive play in the defensive area, as well as fighting and small game exercises that fit the theme of the day.

After the exercise, a little more time than usual was used for the final warm-up and adequate relaxation of the body, because Tuesdays are usually the physically hardest training days of the week.

Wednesday 6th September 2023

On Wednesday morning, the players had the only practice of the day. In connection with the training, everyone is prescribed rubber band exercises that strengthen the muscles of the hip area in addition to the warm-up part, because on Wednesday mornings there is a little extra time to do injury-preventive training.

The ice practice was again carried out with the same theme as the morning practice, which was also shooting this week. Exercises are carried out on a game-specific basis, and they also include passing, taking control of the pass, and reacting to incoming stimuli.

Thursday 7th September 2023

Thursday's practice served as a preparatory practice for the game, as Friday is game day. The subject of the secondary training for the day was speed and agility training, as the players' level of recovery was good after the day off.

In the initial warm-up section, the activation of the calf and ankle area was emphasized again, as well as the ability to activate the area to improve elasticity. Overall, the pelvic area and lower body were also focused on to reduce the risk of injury, and to prepare the body for speed training.

The speed training was performed on the stairs, where we jumped and did different runs. Training on stairs reduces the impact stimulus coming to the body compared to running on concrete, so we try to take this into account in speed training if possible.

At the end of the exercise, we also did short reaction starts on a flat plastic mat surface.

Since a lot of time was reserved for physical training, there was also time for additional middle body training and maintenance training in connection with speed training.

On the days leading up to the game, the ice practice is short and included game like five on five drills, goal scoring drills, powerplay, and small area game drill at the end. On the ice for coaches, a one big theme is also that constantly creating a positive and encouraging environment for the athletes.

Friday 8th September 2023

Friday was game day. Deviating from the routine, the game was played in the bay's SOL arena. The opponent was JYP. In the meeting organized before the game, there was a lot of discussion about mental and physical readiness. In the SOL arena, the rink is smaller than normal, and we knew that the opponent is a team that skates very well and presses hard. Physical readiness to play, and mental readiness to react to quick situations was therefore key. The players have been taught good routines for warm-ups, which they perform on their own before the games.

A meeting for penalty kill- and power play players was also organized with videos.

Right at the beginning of the game, I got hit in the head by a puck, and I had to go to the emergency room in the middle of the game. Two fractures were found in my cheek and upper jaw, so I had to miss tonight's game, as well as the upcoming game the next day.

I followed the end of the game via the video service, and the result was a 0-4 loss. Opponent was significantly more efficient in scoring, even though the picture of the game was very even.

Saturday 9th September 2023

Due to an injury that happened the night before, I was unable to go with the team for the day's away game. The opponent was again JYP, but this time the game was in Jyväskylä.

I followed the match via video. In the bigger rink, our team's better attacking skills rise up, and the efficiency in the goal scoring situation especially in front of the goal was better than the night before.

The team skated well the whole game and the level of the effort was good. The result was a 1-5 Pelicans victory this time.

weekly analysis 2.

The second week was overall more challenging due to many practical issues. As usual, the tasks at the beginning of the week included coaching the team in the role of assistant coach, as well as planning and implementing physical exercises for the players. During the weekend, two players were injured. One of the injuries was a clear impact trauma type injury to the middle of the femoris muscle, and the other injury was a bone fracture resulting from the impact.

From a physical trainer's point of view, it is very difficult to prevent injuries of this nature. In sports, it is almost impossible to avoid all injuries, and injuries are associated with several external and internal factors. External factors include, for example, the rules contained in the game, playing on ice in a rink with hard boards, players' equipment and sticks, and a hard puck. (Peterson & Renstrom 2017, 122.)

Players and indirectly coaches have the opportunity to influence internal factors through physical training. A key factor in injury-preventing training at Pelicans is ensuring muscle balance and sufficient mobility in the area of muscle and joint groups that are essential in hockey. My first week of observation was mostly spent mapping and analyzing the overall picture of physical training process. During the second week, I wanted to pay more attention to smaller things related to my tasks as a physical trainer, and I started looking for a written knowledge base from literature related to my thesis for the physical training that we already

do in the Pelicans U-18 team. Nicholas and Tyler (2002) study has shown, that imbalance between adductor and abductor muscles is a major risk for adductor muscle strains. Also, according to Tyler, Nicholas, Campbell & McHugh (2001) if professional ice hockey players reported adductor strength test score lower than 80 percent from their abductor strength test score they have higher risk for adductor muscle strain injuries during a competitive season (Gamble 2012, 176.) Even though we are not testing this in U-18 team the results from the studies show, that it is essential to consider the strength training of adductors. As a result of this kind of injury-preventing training and optimal warm-up where muscle balance has been taken into account, we can prevent strains and sprains in hip area caused by strenuous efforts - for example, a strong skating kick - which at worst prevent playing for weeks. Things considered in this paragraph gave me some confidence for future. In my opinion we are paying attention to right things in our injury prevention training in terms of the sport. What comes to my own professional development after reading literature related to topics of this thesis, I think that it would be beneficial to develop a test for measuring strength characteristics of adductors and hip flexors. with the help of the test results, we could in the future measure the real need for injury-preventing training of the muscles in the pelvic region such as adductors.

Regardless of the nature of the injuries, my duties include planning an individual training program for the injured players while the injury heals, depending on what the player is able to do. Basically, the actual injury rehabilitation program always comes from medical professionals such as doctors and physiotherapists.

During the first week I analysed the challenge of scheduling because of the constantly changing weekly rhythm and late practice times. During second week I faced this problem practically. We had played on Sunday of the previous week, and on Monday the next training week already started. I decided that the amount of strength training had to be reduced for the week, as the next game was already scheduled for Friday. Decisions about removing or changing physical exercises are always made among the entire coaching group, even though I have the main responsibility for physical exercises off the ice. In terms of year around physical development it is not always optimal to reduce training because of the games, but this time I thought that it is the best practical solution. As a result, I decided that good professional challenge for me for the upcoming weeks is to find some alternative option for combining strength training and recovery during regular season.

Rational for reducing training is that with the hypertrophic strength period, we aim to train so that there is at least one other type of training day between games and strength training days. This is how we aim to optimize muscle recovery and performance for games, as well

as reduce the impact of the delayed-onset muscle soreness (DOMS) effect that occasionally follows strength training on game performance.

In terms of combining, I also have a development need in finding ways to combine injury-preventing training with other types of training within the framework of limited training time, and such an insight was born during the week. I had a long conversation with the head coach of our U-18 team and I expressed my need to find time for injury preventing training from our weekly schedule. Together we decided that in connection with Wednesday's morning practice, the players will be given an injury prevention training program at the end of the ice practice, which everyone should complete. The exercise includes rubber band exercises that promote muscle balance in the pelvic area, as well as mid-body support training, as the lower back -with other muscle groups in pelvic area- is one of the most common places for stress injuries and sprains that cause absences for players (Peterson & Renstrom 2016, 122-125.)

On a personal level, the injury in Friday's game hindered the rest of the week. I got hit hard in the face by the puck, as a result of which I had to leave the game and go to the hospital for acute examinations. Two fractures were found in my face, and according to the doctor's instructions, I should take complete rest that weekend. The injury will also cause personal challenges for the coming weeks, because due to the quality of the injury, I am not allowed to blow the whistle, raise my voice too much, or engage in strenuous exercise. A new challenge is effective coaching when injured.

3.3 Observation week 3

Monday 11th September 2023

Due to the injury that happened on Friday of the previous week, according to the doctor's instructions, I was not at the ice rink on Monday.

Nevertheless, the physical training instructions were given remotely. Since Sunday had been a day off from training, on Monday, according to the agreed weekly rhythm, gym training was mainly for the muscles of the upper and middle body.

The team was supposed to change the type of strength training from hypertrophy to speed strength training, but the session change is being postponed due to my injury.

Upper body-focused exercises always include main movements, as well as side movements that support the sport, for example shoulders and back, which reduce the risk of injury.

After the gym training, the players are also assigned a short warm-up section for the legs, because the off-ice training is always followed by an on-ice training, for which the players must be ready.

Warm-ups are always done using the RAMP model.

Tuesday 12th September 2023

Tuesday was the first day I joined the rest of the team again after the injury. According to the doctor's instructions, I wasn't allowed to participate in the ice training yet, but I did participate in the day's physical training. I watched the ice practice from the stands.

The theme of the physical exercise was strength training focused on the lower body. In the warm-up part, the activation of the hips, calves and ankles was especially emphasized. This has been highlighted during the follow-up period in almost every warm-up of strength and speed training. Strength training was still done with hypertrophy weighting, but we will switch to speed strength next week.

The topic of the ice practice was the offensive play of the defensive area under heavy pressure. The challenge for the defenders in practice was especially the quality of passing under pressure.

For one player, we started making a daily nutrition diary, because according to the weight monitoring, his weight has decreased during the season, even if the goal is to increase it.

Wednesday 13th September 2023

On Wednesday, contrary to normal, I skipped the morning practice, as I would not have been able to train the players on the ice as required.

On Wednesday mornings, the players have also been given instructions for self-directed core and strength training, which does not put much strain on other parts of the body. This allows for an important addition to your weekly training.

In the evening, I participated in the team's physical training as usual. After the heavier exercises of the beginning of the week, the subject of physical training was maintenance training. As the first section, the players did a 45-minute aerobic run. In the second section, half of the players did rubber band exercises that activate and strengthen the muscles in the pelvic region to improve muscle balance, and the other half of the players did whole body mobility exercises. Halfway through the exercise, the groups changed places.

The ice practice was short, and its topic was still the offensive play of the defensive zone. In addition to the big theme of the game, scoring and puck handling skills were practiced on the ice.

Friday 15th September 2023

Friday was a preparation day for the game. The topic of the physical training was the only speed training of the week after the day off. We always try to get at least one strength, speed and maintenance exercise every week.

In the speed training, the aim was again to emphasize the activation and effective use of the calf, Achilles tendon and ankle area in order to better enable elasticity. The warm-up emphasized this same thing. The warm-up also took into account the activation of the thighs and pelvis area to prevent injuries and to obtain better performance.

On the ice, we continued the theme of offensive play in the defensive zone, but the theme of the pre-game exercises always includes power-play and penalty kill training, and lastly, a short small area game section, where we also raise players spirits for the upcoming weekend's matches through hard 3 vs. 3 battling.

The situation of the injured players was also updated in personal conversations with them. A player who previously injured his thigh was awaiting a doctor's diagnosis from MRIs that were taken a couple of days earlier, and one player with a long-term injury was just about to meet with the men's league team's physical therapist for new rehab instructions for the knee. The

player who broke his hand at the beginning of August also returned to ice training for the first time after getting the cast off his wrist.

Saturday 16th September 2023

On Saturday, the team traveled to Helsinki and faced HIFK.

The practice leading up to the game the previous day had gone well, and there was a good spirit within the team.

I was on the trip myself, and I completed all the tasks that belonged to me after the joint preparatory meeting for the game, which included, among other things, running the penalty kill meeting using videos as help. I was not in the players' bench like normally during the game, because due to the injury I still had a strong reaction, for example shouting was forbidden.

Watching from the stands, you got a good picture of the game, the team was better than the opponent in the offensive game of the defensive zone, and the offensive reading in the offensive game. Playing in 1vs1 battling situations was also at a good level, and as a result the game ended with a 3-1 victory for the Pelicans.

After the match, we tried to start the recovery for the next day's game by doing a high-powered, but short final cool-down, and by eating as quickly as possible after the game.

Sunday 17th September

On Sunday, we played again in the bay. TPS was the opponent for the second time within three weeks.

We knew that TPS plays with discipline and their game has a clear structure. We believed that we could still beat them with our attacking skills. The fighting play should also be at the same level as the previous day against HIFK.

The players confirmed that they had recovered well from the previous day, and we also received new players from the older age group team.

In the beginning, the game was loose and disorganized, and the team did not seem mentally ready to play. We lost a lot of 1vs.1 battles.

As the game progressed, we were still able to improve every aspect of the game and the end result was a 3-0 victory for the Pelicans, as well as the top spot in the series.

After the game, three players came to talk to the coaching staff, as they all had lower back problems. As an acute treatment, we went through mobility exercises and light stretches for the back area to relax the stuck muscles.

Weekly analysis 3.

The third monitoring week was completely different from the previous monitoring weeks because of my personal injury.

I followed the ice practices of the beginning of the week from the side of the stands, which brought a certain change compared to my normal coaching. I wasn't given any specific tasks related to coaching, but watching from the stands gives me the opportunity to observe different things during practice. I feel that when watching from the stands, I have the opportunity to observe the players' actions on the ice from a slightly different perspective than when watching from the ice level. I noticed that my attention is also focused on other small things in the players' activities, rather than the main point of the exercise and the practiced theme.

This brought a new perspective to coaching and confirmed my image that a lot more happens in training than just things related to the training theme. I also watched the games from the stands, and my task was to observe the overall picture of the game and look for certain patterns in the playing of the opposing team, if there was a need to adapt to them, for example during breaks. During the weekend's games, no major peculiarities emerged when observing from the stands compared to the opinions of the coaches observing from the ice level.

During the physical training, I was more of an observer throughout the week, and the other coaches ran the actual exercises. This gave a good opportunity to focus on the quality of the players' performance right from the warm-up. Everything in our training starts with a warm-up, and it is very important in preventing injuries and preparing for the actual performance. I want to see our warmups to be a part of developmental training -which is covered in weekly analysis 1 and according to Hakkarainen (2014) warmups are one of the essential ways to maintain

aerobic conditioning during the ice hockey season. Observing teams' warmups gave me a practical idea which I can see as a part of my professional development. During the initial warm-ups, I noticed some variation between the players in how the warm-up is performed from the aerobic raise phase. As a result, I decided to prepare a presentation about the warm-up which covers warm-up as a preparation for the performance, as well as a chance to develop certain qualities. I sent this presentation to the players and printed it on the locker room as a reminder. In weekly analysis 1 I mentioned that one of my tasks is to highlight the importance of injury prevention training to players. In terms of that I can see this action as professional development. I hope that this remainder, which came through just observing the players, will help players to understand more about the aspects of warmups as a chance to develop themselves and chance to prevent injuries and prepare their body for performance.

I strongly believe that understanding the purpose of thing what we are doing -for example warmups- will motivate athletes to perform them better. The motivation to do warm-ups is also increased by the fact that it is possible to modify the contents of the RAMP warm-up according to the player's needs and mood. When the knowledge of the different movements used grows and the requirements of each phase are understood, the warm-up can be modified to suit oneself and make sense within certain frames. (Parker 4 March 2019.)

During the follow-up period, I'm still going to observe the players' self-made warm-up for the games, and thereby evaluate how I've succeeded in creating an understanding for them of the structure, content and purpose of the warm-up. Through observation I also have a possibility to give guidance for athletes if there are flaws in their warm-up protocol.

3.4 Observation week 4

Monday 18th September 2023

Due to the games and training times on Monday, physical training was strength training. As a warm-up, aerobic exercise that raises the temperature of the whole body was done, and then the emphasis was on movements that activate and prepare the upper and middle body.

Since the training time was unusually early, the strength training was done in two parts. First, upper-body-focused movements before ice training, and directly lower-body-focused

movements after ice training. After the ice training, the players already had their muscles warmed up and ready to perform physical training.

The topic of the day's ice training was typically skill-oriented for Monday. The focus was on passing from skating, reacting to pressure and scoring goals.

Normally, we always try to keep ice and physical training suitable for each other, but due to our weekly rhythm, on Monday we had to make a compromise, i.e. combine strength-oriented physical training with skill- and speed-oriented ice training.

One player missed ice practice because he had injured his other hip flexor in Sunday's game, so he was prescribed extra mobility and rubber band exercises to rehabilitate and strengthen his hip flexor. The coaching did not want to take an additional risk for the player of a major injury occurring during the competitive season.

Wednesday 20th September 2023

Wednesday was the day of two practices. In the morning, the players again practiced their skills related to the playing position. The defenders practiced scoring, moving and passing pressure from different situations. The attackers also practiced scoring goals in a way suitable for their own playing position.

Wednesday mornings are also used for core support and strength exercises. At the same time, the players also did strength exercises for the supporting muscles of the pelvic area.

In the evening, the team's own physical exercise practiced speed and the ability to utilize the elastic energy of the calf, ankle and Achilles tendon area. After the day off, speed training fit into the weekly rhythm at this point.

In the evening's ice training, we try to keep the 1vs.1 battling to a minimum, so that the off-ice training matches the on-ice training. Exercises related to the game were mostly done at the five-a-side level.

Earlier in the game, the player who injured his front thigh had also received a new diagnosis for his impact injury. The doctor had found that part of his front thigh had been torn, so his absence will be extended by about two weeks. Currently, the player is rehabilitating his injury

according to the instructions of the physiotherapist, and otherwise he is doing upper body and middle body exercises according to the instructions of the coaches.

Thursday 21st September 2023

On Thursday morning, we had a meeting with all the physical trainers and the physiotherapist about physical training. There were coaches from the under-18 age group up to the men's league team.

In the meeting, we went over things related to physical training that are good in the teams and where there is room for improvement.

The general picture of the training and the development of the players' test results was good, and especially the qualities related to skating have developed greatly at the team level in the last seven years.

The characteristics that could be developed were found in all teams mostly in the support and strength characteristics of the middle body and upper body, which affect battling situations, balance and partly shooting on the ice. The under-18 team was also found to have large individual differences in lower body strength characteristics, which affect the feasibility of speed training.

For upper body strength training, we tried to find even small gaps in the weekly schedule, which is sometimes challenging during the competition season. For example, the time after the last home game of each week could be used to the advantage of a short strength training session.

In the question about speed training for the under-18 age group, it was agreed to utilize plyometric exercises which are getting progressively harder during the training block, and exercises that activate the calf and ankle area, which can be used to improve movement rhythm and the beneficial use of elastic energy. The age group under 18 has started to emphasize these exercises few weeks before the meeting.

In the evening, during the team's training, there was maintenance and aerobic training for the whole body. The players first did an aerobic exercise lasting about 35 minutes.

After this, the players in two groups did the most whole body mobility exercise, where the mobility of the hip flexors, adductors, buttocks and lower back was emphasized, as these places are constantly under stress. The second part consisted of routine rubber band exercises to improve muscle balance, control and strength in the pelvic area.

The ice practice was a routine preparatory practice for the game, which included a 5vs.5 practice according to the theme of the game, which was attacking play in the central ice area and turning the play in the central zone. We also practiced powerplay and at the end of the practice there was a small area game section like always.

Friday 22nd September

On Friday, the team traveled to Helsinki for a game. The Jokerit were up against each other and there was going to be a battle for the top of the whole series. The Pelicans led the series on Friday and the Jokerit were in second place.

The Jokerit are a team with great skating power and a lot of pressure, and the rink is very big in their home hall, so the coaching emphasized the importance of physical and mental preparation after the bus trip.

Despite this, the Jokerit took a three-goal lead right at the start. Thanks to a little luck and the cooldowns taken by the Jokers, our team still managed to take the lead in the second set, and the final result after a good last set was a 3-6 victory for the Pelicans.

The coaching still gave the players constructive feedback due to the weak start of the game, because in the future we don't want to give the opponents an advantage that we are not physically ready to play against good teams.

For the next day's game, the plan was to improve especially the preparation for the game.

As a practical activity after the game, the players had to do a really quick cool-down and go to eat as a team as quickly as possible. The game didn't end until half past ten in the evening, and the next day's game is already played at noon on Saturday.

Saturday 23rd September 2023

On Saturday, the battle between the two top teams was played again, as Tappara had risen to second place in the series the night before.

The team was focused on their own performance and, above all, on improving the start of the game from the previous night. The day didn't start in the best possible way, because one of the top players slept through our starting meeting.

The start of the game was again a bit shaky, but still better than the day before. Tappara took a one-goal lead right at the start, but we managed to tie the game almost immediately after the first goal. The team improved their game again in the second and third sets. The defensive game worked at a sufficient level, and we managed to score one more goal ourselves. The final result was a 2-1 win and we kept the top spot in the series.

Furthermore, the coaching emphasized the importance of preparation after the game in order to increase game readiness, as well as just to prevent injuries. The players have been given good instructions and a business bank for performing a RAMP-type warm-up, which is a good model for doing warm-ups.

In accordance with the instructions of the physical meeting held earlier in the week, we used the time after the game to do a short indoor exercise. After the game, all players did half an hour of upper body and core strength training to add weekly volume to these body parts.

On the same day, a player with a long-term knee injury had also received a new diagnosis for his injury. The injury will have to be operated on, so his rehabilitation time will be extended indefinitely.

Weekly analysis 4.

During the fourth week of observation, my work in physical training was extensively reviewed by the other coaches of the club. The meeting between the physical trainers during the fourth week served as a good tool for my professional development. I received feedback on the physical off-ice training of our team and about the content of the training. I also received practical help for placing the training sessions in our schedule, which I have found in previous weekly analyses to have produced challenges from time to time. Since the framework of

physical training has already been discussed between the coaches in earlier meetings during the season, there were no major discrepancy in the training process between the different teams.

The starting point for the meeting was that the themes and priorities of each team's physical training have already been established appropriate for players development inside this particular group of coaches led by physical trainer of Liiga team. For this reason, the training of the U-18 and U-20 teams was largely viewed together as a whole. The differences between the teams regarding the content of the individual exercises were discussed, as the physical readiness of the players in different age groups to perform the exercises differs from one another. The personal movement choices of mine and the U-20 team's physical trainer in strength training and injury prevention training also differs, but still both of our movement choices were evaluated to serve optimal physical development in terms of Ice hockey. Through this comparison I decided to switch some material for Injury prevention training with U-20 teams physical trainer so both of us could get some more material and variety in our teams injury prevention practice sessions. I personally hope that the chance for variation will also help to keep athletes motivation higher in practice, so that we don't have to do exactly the same Injury prevention training exercises through the whole season.

All the coaches also shared their views on doing injury-preventing training, and the common points that emerged were taking care of the muscle balance in the pelvic area, sufficiently strong supporting muscles of the middle body, and a sufficient amount of strength training in general. In order to comprehensively prevent injuries, as well as to obtain the best possible performance, comprehensive recovery from training is also necessary (Joyce, Lewindon & Verstegen 2014, 71), but in the coaches' meeting, more physical things performed in the team's training, which can be done to prevent injuries, were discussed. During my thesis process I have found that many sources in literature emphasise the importance of recovery, but in the meeting recovery was only covered on a superficial level, and it was stated that it is important. I think it would be useful to review recovery monitoring and practical ways to recover in the future also at these meetings. For my own future professional development, it would be good for me to try to find ways to monitor recovery that would be easy to implement in a practical environment with the resources at hand.

In connection with the physical training meeting, challenges related to the scheduling of training, related to the amount of training per week, also came up. I find scheduling the team's physical training to be challenging, because from the point of view of the players' physical development, it is important to get a sufficient amount of training to develop the desired qualities,

but at the same time, the physical training should have themes related to ice training on a daily basis, they should serve to get the best possible performance for game events, and they should be done within a week with limited time resources. (Hakkarainen 2012, 4-5) We tried to find clarity for this challenge with several other physical trainers, and we found that the time after the last home game of the week is usable for a short strength training sessions which partly helps me to include a sufficient amount of strength training in weeks during regular season.

Related to extra strength training times, the physical trainer of the Liiga team brought up a point about the results of the physical tests, which he had compared to the test results of the young national teams and the test results of the NHL draft combine event. This fact was that in the Pelicans' U-18 and U20 age groups, the upper body strength levels of many players are a bit low in relation to the lower body strength levels when compared to the other groups mentioned above. As a practical measure, we decided to emphasize certain upper body strength exercises in the future. I think that in this sense I gained professional development related to combining physical exercises to ice training.

Overall, during the week, I was able to develop my own expertise regarding injury-preventive training and other physical training through discussions with other physical trainers of the club. Discussions with other physical trainers, some of whom have been professionals in the field for years and worked in a similar role in the Finnish National Team, for example, gave me new ideas for practical scheduling and the practical content of injury-preventing training. I also gained self-confidence to carry out training and coaching in the form of positive feedback. Regarding the test results from physical tests on- and off the ice which we have done regularly in each age group the team's physical training as a whole was found to develop the players' physical qualities. Knowing the content of our teams physical training sessions, it was evaluated that there is enough developmental physical training in our weekly schedule, the contents are appropriate, and the players' physical qualities have been taken into account in training. There is enough injury-preventing training and it is directed to the right areas of the body. The risk of injury has been taken into account in every training session, at least in the form of warm-ups and final cool-downs. (Nakari 21 September 2023.)

3.5 Observation week 5

Monday 25th September 2023

On Monday, we changed the strength training period outside the ice. Strength training changed from hypertrophy type strength to speed strength type training. We first went over the basics of speed strength to the team on a theoretical level, because it is important that the players understand what, how and when they are doing different things. After that as a physical exercise of the day we did the first speed strength session.

Making a good initial warm-up was emphasized, as the players' bodies had to be ready to train speed strength. The exercises were done in the gym and on the stairs, as both environments served our goal of developing the speed end of the force-time curve.

On the ice, as is typical for Mondays, we did a lot of skill based exercises without a lot of 1vs.1 battling and practiced scoring in different situations and scenarios.

There will be a smaller number of players than usual in training all week, because all players born in 2008 - of which there are five in our team - will be at the Pohjola camp all week.

Tuesday 26th September 2023

Due to constant regular season games, the weekly rhythm defined for Tuesdays an aerobic and maintenance exercise outside the ice.

The exercise routinely included strength exercises in the pelvic area with rubber bands and in pairs. As the second part, the training included a part containing mobility and stretching, where the players went through dynamic stretches, especially for the muscle groups needed in skating.

The players were also given a short survey about their own physical condition. The survey aimed to find out if the players have pain conditions or accumulated physical fatigue anywhere in their body. Almost all the players said they were fine. One player had slight stiffness in the lower back area.

On the ice, there were more themes related to playing 5vs.5, and they were practiced in 5vs.5 level drills. The topic was the attacking play in the neutral zone and the decision of the rush in to the attacking zone.

One of the topics was also winning 1vs.1 battles, which were practiced with the help of small area games.

Thursday 28th September 2023

On Thursday, off-ice training focused on speed. Since at the beginning of the week we switched to a speed strength period, Thursday's speed training was also done in a new way. The exercise included a good warm-up and a short portion of maximum strength in the gym. After the maximum strength part, the players practiced the speed of changing direction with spurts, i.e. with their own body weight. Moderate maximal strength training fits well with an otherwise speed-strength-focused period.

On the ice, as usual, we practiced 5vs.5 level exercises according to the chosen theme, the theme was neutral zone offensive play and the decision of a rush attack. In one of the drills, we also practiced the offensive play of the defensive end, which ended with the decision of a rush attack, i.e. scoring a goal.

As usual, the practice ended with a competitive small-area game, where the spirit was created for Friday's game day.

Friday 29th September 2023

Friday's match was played in Espoo and the opponent was Kiekko-Espoo. Mental preparation and a good and humble attitude were emphasized to the players before the game in the game meetings, because we knew that the opponent had a good team, even though they were in last place in the league table. For young athletes, such things may affect performance in games.

The start of the game was good and our team dominated the first period, but in the second period it seemed that the players thought they had already won the game when we took a 0-3 lead. After a few minutes, the game was 4-3 in favor of Kiekko-Espoo. In the second set break, things were reviewed, and in the third set our team improved their game enough to win 6-4.

After the game, it was vital to have a quick final warm-up and a sufficient amount of food, because the next morning the team will travel to Rauma for the next game. It was therefore important to restore energy levels as quickly as possible in order to maximize performance and minimize susceptibility to injury.

Saturday 30th September 2023

On Saturday, the team suffered its first loss in a long time against Lukko from Rauma. I wasn't part of Saturday's game trip, because I was at the funeral of a close relative who died recently, and as a result it was impossible to make the trip.

However, I watched the game on video. The game looked even, but both teams had few chances to score. Lukko managed to score two goals as a result of personal mistakes by our players, and managed to defend well the rest of the game. As a result, the Pelicans managed to score only one goal.

Weekly analysis 5

The fifth observation week as a whole required a lot of mental resources from me. The change in the strength training period from hypertrophic strength training to speed-oriented strength training was a big task for me, as well as a big change for the players. The biggest professional development for me came in the form of a change in this training period. As a coach, this was the first time for me that my team switched to speed-based strength training, and for many players it was also the first time that purely speed-based strength training was implemented as part of training. This led me to look for information related to the right types of exercise also in the literature. Written sources gave me some practical interventions for

From the perspective of injury prevention, many things had to be carefully considered when planning the training period. Especially in high-intensity exercises, the importance of an adequate warm-up increases due to muscle sprains and strain injuries, as well as ligament and tendon strain injuries (Gamble 2011, 123-125). I have used a warm-up based on the RAMP model for the team's players, and implementing this thoughtfully is a good way to safely prepare the players for high-intensity training as well. In connection with the warm-up, the sufficient duration of the warm-up (>10 minutes), intensity (moderate exercise intensity of about 70% VO₂ Max) and a sufficiently long time between the warm-up and the actual exercise (5-15 minutes) must also be considered. (Gamble 2011, 126-128.)

I also did a lot of thinking and reading to find suitable exercises, because the exercises should have some kind of possibility to adjust the intensity and the demandingness of the power used. The personal physical readiness of each individual must be taken into account, as the different elements of speed-type training basically require more basic qualities (for example, maximum strength) than lower-intensity training. The danger for the individual in high-intensity exercises that strain the body too much is stress injuries to bones and joints, as well as muscle strains and tears. (Gamble 2011, 103-110). This doesn't mean that that all individuals could not perform speed or speed-strength type exercises. It means that I must consider carefully how I build our weekly training sessions. My plan is that in the beginning we keep the weekly volume moderate in speed-strength type training and as the period progresses, we aim for progression in speed-type training with volume and loads. This gives individuals time to adapt to a new type of training.

Related to challenges described in the previous paragraph, the most challenging thing for me during the week was to plan the optimal training rhythm for the speed period in terms of performance and development with the help of the head coach. As the weekly high-intensity work of the players increases, sufficient recovery time is also needed. Full recovery from prolonged high-intensity exercise that stresses the central nervous system (CNS) requires at least 48 hours to prevent CNS fatigue from accumulating. If the recovery from high-intensity exercises is insufficient, the ability to function is limited, and the risk of injury for players increases due to reduced movement control and reduced maximum muscle strength. (Bott, August 2015). This doesn't mean that players will be at full rest during the next 48 hours. This means that in between two similar high intensity practice session there should be at least 48 hours and also it would be optimal to have at least one rest day before these kind of training sessions. In some training weeks based on this, we are only able to perform one high-intensity speed-strength training, but as a solution to this, we use combination exercises according to Hakkarainen's (2012, 4) model, which have elements of speed-strength training as part of it. In this case,

speed strength training can be included in several exercises, but the fatigue that strains the central nervous system does not accumulate so much at once.

Short questionnaire about players physical status gave me the idea of starting to put together short personal maintenance and injury prevention training programs for each individual that they would perform on a weekly basis. In this way, the amount of injury-preventing training could be increased at the team level, and each player would be able to train a specific area of the body for which he feels the need. For example, an individual suffering from stiffness and weakness of the hip flexors could direct extra training to this part of the body every week. Personal routines for the players from the point of view of injury prevention will be formed in personal meetings in the coming weeks. These routines have already been established for some - for example, players injured during the follow-up period - but the actual prevention should be implemented before the injury has occurred. I didn't set myself an exact time window by which I want this procedure to be completed, but for the future, I think it will serve my own professional development.

3.6 Observation week 6

Monday 2nd October 2023

On Monday, due to the combined effect of the upcoming week's rhythm and the desired physical training, the team trained strength with an emphasis on the upper body off the ice. In a joint meeting of the physical trainers earlier, it was agreed that spaces for upper body strength exercises should be found in the weekly schedules for each team.

In addition to the initial warm-up, strengthening exercises for the supporting muscles of the middle body have been done in connection with the strength exercises. After the strength part, the players also did warm-up movements for the legs for the actual ice practice.

Also in terms of ice training, the week started in a different way than normal, because the coaching wanted a lot of 1v1. exercises involving struggle instead of skill-based exercises.

The players who participated in Pohjola camp the previous week were given Monday as a day off, as they had had a hard week at the camp without days off.

Tuesday 3rd October 2023

On Tuesday, my duties included running the team's physical training with an emphasis on speed strength. The speed-strength training, mainly aimed at the lower body, was seen as possible to implement, even though it had been practiced the previous day, because the players' weekly load was not yet very high. Doing a good warm-up during speed and speed strength exercises is emphasized, because high-intensity exercises cause severe stress on the muscles during short performances.

In ice practice, we did position-based drills for defenders and forwards separately. I was responsible for the planning and execution of the defenders' exercises. The topic was the offensive play of the offensive zone against active pressure.

The situation of the injured players was also updated, and I ordered new exercises for one player, as the player in question is getting closer to playing condition.

I also had a conversation with one player about good and adequate nutrition at the player's initiative, and it was agreed that the player in question would start filling in a nutrition diary for a week. After the monitoring period, the food diary is reviewed with the player.

Wednesday 4th October 2023

On Wednesday, my duties included participating for the morning ice in the role of an assistant coach. At the beginning of the ice, I give the players personal feedback on the performance of skill exercises designed by other coaches. In the second part, there are always position-specific drills for defenders and attackers separately. In this section, I work as an assistant coach and give feedback to the players on defenders end of the rink. The exercises are mainly planned and led by the head coach of the U 18 team, but I also participate in the planning process of the exercises.

On Wednesday, the morning training also includes a maintenance and injury prevention section performed by the players on their own, which focuses on the muscles that strengthen the middle body, as well as the muscles in the pelvic area.

Thursday 5th October 2023

My work assignment for Thursday's practice changed due to the sudden illness of the team's head coach. I took Thursday's practice to the team in the role of head coach, which included going through all the practices for the team, as well as giving general feedback to the players.

In addition to the usual physical training, the day's tasks included planning ice exercises according to the given topics, as well as conducting the exercises and observing the overall picture.

Being in the role of head coach from time to time brings a good challenge and change to everyday life. In this case, the interaction with the players is slightly different than in the role of an assistant coach.

Overall, the training event went well from start to finish. The atmosphere and the level of effort of the players was good both in the physical training and in the ice training.

Friday 6th October 2023

Friday was the day of practice preparing for the game. I instructed the team to do an aerobic exercise first, after which the team did maintenance training in two different groups. The second group did mobility exercises again, and the other group exercises to strengthen the muscles of the pelvic region and the middle body. This time, the strengthening exercises were done without rubber bands to add variety to the training. Friday was a good fit for this type of physical training, as there is a two-day game trip to Kuopio and Oulu on the weekend.

A new Czech player also joined our team, who has trained with the U20 team in the early season. He had a small injury in the hip flexor area, so I instructed him on his own maintenance exercise, and a good warm-up for the ice exercise.

We tried to keep the ice training light in terms of physical exertion, but in accordance with the norms of training preparing for the game, there was also a short small area game section at the end, which included short high-intensity 1vs.1 battling.

Saturday 7th October 2023

On Saturday, the first thing ahead was a bus trip to Kuopio, after which the team had a game against Kalpa. The tasks included compiling the material for the penalty kill meeting, as well as running the meeting for the players.

In addition to this, I acted as an assistant coach during the game, and was responsible for playing the defenders, as well as the main part of the feedback given to them during and after the game.

There was also one extra player on the game trip who didn't play on Saturday, so an individual training session for Saturday was developed for him, which included a short aerobic section, a short speed section and maintenance training to finish. With this, they tried to prepare him for Sunday's game and the stress levels could be kept low enough.

The game event itself went very well for the team. Especially in the direction of attack, the team was very efficient, and the practice of the attack game in the attack area was strongly reflected in the performances during the game. The result was a 1-9 victory for the Pelicans.

After the game, I gave the team a short final cool-down and a relaxation exercise to get the recovery started and the body relaxed for the bus trip to Oulu.

Sunday 8th October 2023

On Sunday, we prepared as a team for the second game of the weekend. After the night at the hotel, I led the team for a morning walk, after which the team went to breakfast. Before the game, it was the coaching's responsibility to emphasize the importance of getting enough nutrition in order to get the energy levels as high as possible for the game after a short recovery period.

My duties also included compiling the material for the underpowered meeting from videos, as well as holding the meeting at the hotel. I also translated the material of the superiority meeting into English for two of our Czech players.

Before the match, my role was to emphasize doing a good warm-up for the players, because the rink is big in Oulu, and Kärpät are a very good skating team, so you have to be ready to meet the skating challenge.

The previous day, two players had also suffered minor impact-type injuries, for which I gave warm-up and self-care instructions.

The first two periods of Sunday's game were weak from the team. The skating challenge was not met, and the 1vs.1 battling was at a weak level. The result was a 4-2 loss.

Weekly analysis 6

The beginning of the week again required skills related to planning and monitoring the total workload on a weekly basis. During the past observation weeks, I have already noticed several times the challenge related to planning the weekly rhythm, and the sixth observation week was no exception in this sense. Planning the internship was the most challenging task of the week for me, and the most developing task in terms of professional development.

In practice, I always get help from the team's other coaches when planning the week, and together we make the final decisions about the weekly rhythm and the themes of the exercises each week. The key issue in weekly training during the holidays is player development versus player recovery. We want to train enough during the season, so that year-round development is possible for growing athletes, but at the same time it must be taken into account that the level of physical activity every week is high, and from the point of view of optimal performance and injury prevention, sufficient recovery time as well as rest and nutrition are also needed (Joyce, Lewindon & Verstegen 2014, 318.)

In practice, I planned there was only one actual central nervous system-focused speed or speed strength training session during the week, because I had to take into account the total weekly stress and the additional stress brought by the long game trip on the weekend. Long overnight game trips must always be considered in the weekly plan, because traveling by bus, as well as the rest of the day's program and the night spent in the hotel, is always a different situation for the players and their recovery. Even in the weeks of one speed strength training session, the training model used by our team helps in planning the training, which enables combining different physical aspects into one training session. I stated in one of my earlier

weekly analyses that as a solution to ensure adequate recovery, I would not always want to directly reduce the amount of training. During this week, I realized that at some point the off-ice sessions where we combine different physical aspects have been partially forgotten except for aerobic conditioning which we do almost daily during warmups and cool-downs. In this case, delving deeper into my team's own training model during the observation period helped me to remember this possibility.

Part of my professional development during the week was also following the food diary of one player and analysing and giving feedback about his eating habits. My role also includes helping players manage their overall development, which includes nutrition. The right type and sufficient amount of nutrition must be ensured during the competition season, as nutrition is an important factor affecting recovery, as well as a key part in maintaining performance. Indirectly, insufficient food intake also increases the risk of injury through a weakening of the ability to recover. (Joyce, Lewindon & verstegen 2014, 330), (Kellmann & Beckmann 2017, 210-211.) For this reason, as a coach, I have to be knowledgeable about the key topics related to athlete nutrition, and if necessary, guide the players and make them understand the importance of adequate nutrition in performance sports.

A change in coaching roles also brought its own challenge to the week. I was in the training on Thursday in the role of head coach, so my duties included many other things in addition to my normal work duties. Because of this, I was unable to supervise physical training on Thursday as usual. The other two coaches of our team led the physical training for the players, and my role was to instruct them on what to do, and on the other hand to trust that they also do a good job and demand a good level of performance from the players in the physical training. On the other hand, changing coaching roles from time to time also brings me professional development, because it helps me see the overall picture of training better in practice, and it helps me understand how much more a training event includes besides physical training.

3.7 Observation week 7

Monday 9th October 2023

After the weekend game trip, Monday's practice served mainly as a restorative maintenance practice after a tough week. My task on Monday included planning a physical exercise according to the day's theme. The physical training included aerobic training as well as whole-body mobility training and strengthening exercises for the pelvic and core area. At the end of the physical training, I wanted to make sure that the players were ready for the upcoming ice training, so we did short change of direction runs to prepare for the ice training.

The ice practice was skill-based, and the aim of the coaching was to draw attention to the players' reaction, puck control, passing and goal-scoring skills. We had to emphasize the importance of the exercises to the players several times during the training, because at times what was done clearly lacked sense of purpose, and the effort was at a weak level. During training, the players' performance generally improved.

My second task on the ice was to order heavier skating sets for one player who has been injured for a long time and is starting to get very close to full fitness.

Tuesday 10th October 2023

The changes to the team's practice and game rhythm due to practical matters changed the week so that on Tuesday we practiced upper body and core strength training according to the plan I made.

On Tuesday, I was responsible for running the team's physical training according to the weekly plan made together by the coaches.

Normally, for the days at the beginning of the week, we try to get speed or speed strength exercises, where the intensity is high, according to the period, but since the team has been under stress since Friday of the previous week, it was not considered useful to carry out a high intensity nerve system stressing exercise for Tuesday.

In connection with the upper body strength training, the players are always instructed to do an extra section that warms up the lower body muscles before the ice training, so that the players' level of readiness for the ice training increases, and the risk of injury decreases.

The ice training planned by the head coach was battling-focused, so the ice and physical training fit together in accordance with the training model used in Pelicans.

I also went through discussions about personal training or training plans of injured players and players returning from injury, which serve their rehabilitation, as well as staying fit for the game after injuries.

Wednesday 11th October 2023

On Wednesday, the routine part of the morning practice was assistant coaching on the ice. In addition to that, the preventive physical exercise I planned has been distributed to the players to do on their own during morning practice.

A short meeting was also held for the players participating in the morning practice about the importance of warming up before the morning practice, as the coaching team feels that not all players are ready to practice in the morning right from the start of the ice, which wastes practice time on the ice. By warming up, players also prevent their own personal risk of injury.

Thursday 12th October 2023

On Thursday, the team had the opportunity to practice speed off the ice. My task was to plan and run a speed training with warm-up. The warm-up was carried out using the RAMP model, and the warm-up emphasized the activation of the calf and ankle area and the comprehensive preparation of the hip area for the exercise. The speed training was carried out on the stairs, as well as running with short change of direction runs.

Our head coach wanted to observe the ice practice from the stands, so it was my responsibility to implement and lead the ice practice for the players in the role of the head coach. In practice, I talked the players through pre-planned exercises and gave the players general feedback on

the ice based on my own analysis and observation. This brings a good change to the usual role of an assistant coach, in which case the feedback is often more personal.

The game topic of the exercise was the defensive play of the attack, which was practiced through game situational exercises, as well as position-related for defenders and attackers.

In connection with the practice, I also instructed the team's two other assistant coaches to give instructions to the rehabilitating players on the ice, who did not participate in all the exercises done together, but are approaching game fitness. As the main leader of the exercise, I would not have had time to properly carry out this task.

After practice, I gave general feedback and my thoughts to the players in the locker room together with the other coaches, and I instructed the players on the final warm-up, which is always done with decreasing intensity.

Friday 13th October 2023

Since the games of the seventh observation weekend were moved to the coming weeks, a different practice was done on Friday than normally on the days leading up to the weekend games.

The head coach wanted a short training session that includes a lot of small-area games and battling between players.

As a physical exercise, I planned to do maximum strength, because the first gym workout of the week had been on Monday, and there were two full days of rest after Friday, so there was going to be enough recovery time.

We try to warm up for maximum strength exercises according to the RAMP model, and in the last step of the warm-up we also do warm-up sets with movements that are also done in the actual maximum strength exercise. I chose the movements of the maximum strength exercises carefully, because I wanted to find movements that are safe for the players to do, but at the same time allow them to express themselves and produce as much force as possible in the movements. For example, the rack pull from below the knee and the trap bar deadlift work well here.

My task always during the maximum strength exercises is to observe the players' technique, level of effort and to go through the purpose and goal of the movements at theoretical level and sometimes with practical example.

My task for the day during the ice practice was to encourage the players to get the best possible sense of performance and team spirit, so that we get the most benefit from the battling drills as well as game-like feelings and reactions.

Weekly analysis 7.

My professional development for the week came through the creating of motivation in physical exercises, as well as from joint discussions with other physical coaches, where we talked about weekly recovery.

Normally, in the team's everyday life, the weeks without games are used as an opportunity to train a lot in quantity. This has been due to the fact that there has been no need to maximize performance with games in mind, and weekend game days have generally been used for recovery. This week, from head coach's recommendation we made a plan to keep the workload low in quantity, but to focus on the quality of the training and the motivation of the players to perform. I have often had the idea that in the weeks when there are no games, we train extra hard, without thinking too much. As coaches, in this situation, we wanted to think about the players' recovery in the midst of a heavy competition season, and the week without a game was seen as an opportunity for that. For the future I must highlight that recovery monitoring system would be a useful tool to actually measure athletes' level of physical and mental ability. The total volume of stress brought by training was lowered, but the quality of the training was to be kept good. At the same time, the players also got a good opportunity to recover psychologically, when they didn't have to think too much about their performance in games or particularly heavy training. We also knew that the two weeks following the seventh week of observation would be very stressful, as the team had six games in the program during the 14 days. For this reason, we wanted the players to be fully recovered and ready for the coming weeks. This week, planning the training schedule again guided my professional development. I had to modify our long period plan for physical training, as the games of the seventh observation week were moved to the following two weeks at short notice. Basically, it meant that during the seventh observation week our team had two extra days free, but after seventh week there

would be six games during two weeks' time period. I noticed that a coach's ability to modify plans quickly, if necessary, to be optimal for the players is an important skill.

The physical strain from ice training was moderate throughout the week, so high-intensity strength training was possible. As a coach, I still wanted to keep in mind that the players are still adapting to the ongoing speed-strength training, and in addition, we are still training maximum strength during the same period, so we don't want to overload the players with training that strains the central nervous system at this stage. The signs of central nervous system fatigue must be constantly monitored, by monitoring the athletes' mental state, motor skills and physical power output (Kellmann, Beckmann 2018, 3-19.) Even though I haven't built a comprehensive recovery monitoring system for players in the U-18 team I try to follow players physical ability by recording the loads used in the gym, by having a weekly weigh-in on a scale for every player and by generally asking questions about players quality of sleep and mental state. In this way, I can have at least some kind of view about athletes physical and mental state.

The biggest challenges of the week were at times in practice, and the players' internal motivation towards training was strongly present here. It seemed from time to time that during the week's physical training - especially on the days of injury prevention training - the players' focus was somewhere other than performing the exercises in the highest possible quality. My big goal in the field of physical training is to create feelings for the players that injury-preventing training is appropriate and has an important purpose. When a player is fit, he has a much better chance to develop, and he gets to do what he really likes, that is, practice his sport without restrictions. I took this into account by having two extra speeches about the purpose of the practice and how the players can help their own development by doing those things. I also encouraged players to ask questions about exercises and about anything we do in off-ice training sessions if they feel like it is appropriate. Last thing I did was a little change to our normal injury prevention exercise routines. In earlier weekly analyses I wrote that I changed some practical material with the physical trainer of U-20 team. To create variety I utilized some of the material which U20 coach gave me into our programme.

The ice hockey season is usually long, and in order to guarantee year-round development, one should be able to maintain a high level of concentration throughout the season. Many things can affect a player's level of concentration and motivation, such as injury, one-sidedness of training, failures, feelings of incompetence, lack of clear goals or lack of clarity about goals and the factors that help to achieve goals. In order to reduce the potential of these variables, the coach must ensure certain points in training, which are: 1. The players must have a

physical goal. 2. Exercise serves this physical goal. 3. The athlete receives enough feedback on his activities. 4. There is communication in both directions between the coach and the players. 5. The athlete gets feelings of accomplishment from training. 6. The athlete understands the training process and what is expected of him in training. 7. There is enough variation in the players' training during the season. (Joyce, Lewindon & Verstegen 2014, 304-305.) This source from literature which I had read during the monitoring period was particularly useful when I faced this problem during the week. This highlights that it has been helpful for my professional development to read theoretical information about physical coaching and training during the whole monitoring period.

Monitoring my own work in itself brings great professional development every week, because I look for a lot of information with which I justify the effectiveness of my own activities, and which I partially compare with the information produced by my own experience. When looking for answers, I often also read other things related to the work of a physical trainer, which might help in the future.

3.8 Observation week 8

Monday 16th October 2023

Monday marked the start of a heavy period for our team. The team will play six matches within the next 14 days, so my main task of the day was to plan and modify the team's physical training plan according to the fact that the players were currently in the games and the energy levels could be kept high. The plan will be to reduce the team's nervous system-straining strength training for the next two weeks, when the team will train strength only once a week. I also planned to keep the speed exercises short, about eight speed strokes, and spend more time on maintenance and injury prevention training. Our head coach also liked this plan.

According to my plan, my task was also to plan and implement Monday's physical exercise, which was a strength exercise for the whole body with maximum strength after the free weekend. The importance of the warm-up as an element that prevents injuries and improves readiness was emphasized again. In my opinion, the limited training time brought challenges to the implementation of Monday's physical training, because I wanted to lead the players to a good

warm-up for the actual strength part, and the recovery times during the strength part had to be kept relatively long in order to get the intensity and power of the training high.

During the ice practice, my task was to give personal feedback to the players on the performance of skill-related drills. Coaching would have liked to practice more game-related drills on Monday, also at the 5 vs. 5 level, but due to the absence of several players, this was difficult to implement.

After the late practice, I led a common final cool-down for all the players, in connection with which we did a relaxation exercise, so that it would be easier to fall asleep faster when going to bed.

Tuesday 17th October 2023

On Tuesday, my task was to lead the players' care and injury prevention training. The content included a section on mobility and strengthening the musculature of the middle body. In connection with the physical training, we also did a short speed section, which included three fast sprints on the stairs and three change-of-direction runs. With the help of the speed pulls, we were able to prepare the players' bodies for ice training, as well as speed stimulation for the nervous system, because outside of Tuesday's training, the training week will be very light on the nervous system.

I felt that the maintenance part of the physical training was a bit challenging for the players and myself on Tuesday. Mobility, mid-body strength, and pelvic area strength exercises should always be done with calmness and concentration, but on Tuesday, the team's focused atmosphere was disturbed for some reason. Several players did the exercises loosely and the focus was clearly on things other than developing the desired qualities. I had to correct the performance of several players through feedback, but despite that, the atmosphere did not serve the developing practice in the best possible way. There can be many reasons for a lack of concentration.

The ice practice was a routine practice to prepare for the game, but we focused more on playing short-handed. My task was to explain to the players the principles of the short-handed game and then guide individual players on more specific short-handed game situations. I felt

that the players tried to adopt the desired principles well, and the right things could be seen in the training.

After practice, my task was to give the players a small survey about their current physical state of alertness, and about possible minor ailments that some of them might be suffering from. I also routinely gave the players recommendations for cooling down, as well as nutritional instructions for individual players in case of game days.

Wednesday 18th October 2023

There were no morning practice this week for the team, since Wednesday was game day for the team and the opponent was Jokerit from Helsinki.

The day's tasks included leading the short-handed game meeting and selecting the video clips to be reviewed.

My second task was playing defenders during the game and giving feedback on game performances.

Overall, the team's game performance on Wednesday was weak and the result was a 2-6 loss. Coaching defenders was challenging and there were a lot of easy personal mistakes. After the game, I wanted to have a personal conversation with the two defenders about the possible reasons for the poor performance.

One of my tasks on Wednesday was also to have a personal meeting with a long-term injured player about his training program. Along with the physiotherapist, I am responsible for the training of injured players, and within the framework of the physical condition, the aim is to create a training program for each player that serves rehabilitation and performance development and maintenance as well as possible. Together with the player, we made a good framework for the program, and during the current week, my task is to produce more detailed content for the program.

Friday 20th October 2023

Friday on training day was very much like Tuesday. The team had a training session preparing for the game, in connection with which my task was to lead the players in the second protective and injury-preventing physical training session of the week.

Deviating from the norm, the training venue was Lahti's SOL arena. Due to the control of physical stress, the physical exercise consisted of an aerobic section and a pelvic strength and control section as well as a mobility section.

The ice practice also differed from the usual practice preparing for the game, so that we did not practice special situations at all. We focused on 5vs.5 situations and offensive and neutral zone defensive play. My task was to focus on the defenders' playing in these game situations and give them general feedback as a group during the training break, as well as individual feedback whenever there was a reason for it.

I also prepared personal short physical meeting times for the players. The purpose of the meetings would be to find out each individual's injury-preventing and maintenance training needs and their own thoughts on the matter. Through this, it would be possible for certain individuals to emphasize a certain type of injury-preventing training and routines, for example, before games. After ice practice I also held a little meeting for everyone about the importance of sleep and nutrition in terms of recovery during a competition season. I felt that it is a good idea at this point in the middle of a physically stressing weeks.

Saturday 21st October 2023

On Saturday, the topic of injury prevention training included the task of arranging a new meeting time for physical training with the physical trainer and physiotherapist of the men's league team. Enthusiastic about the previous physical meeting that was organized a few weeks ago, I wanted to further promote my own knowledge and expand my knowledge bank on the multidimensionality of injury prevention training. The upcoming meeting will be a one-on-one meeting, where the main topic is injury-preventive training and physical development during the season.

As with the game days, my tasks included the planning and implementation of a short-handed game meeting with the players.

As the coach in charge of physical training, my job is to be available to the players on game days for physical preparation or for matters related to nutrition, for example, on the basis of which one player came to ask for advice on how to eat enough before matches played at relatively early hours.

During the match, my task was to work with the defenders on the bench and as a feedback provider. The team's performance on Saturday was better than on Wednesday, but the result of the game was not favorable for the team. The defensive game worked somewhat well, but the inefficiency in the offensive game had a negative effect on the final result. The result was a 0-1 loss against Helsinki HIFK.

Sunday 22nd October 2023

On Sunday, the team traveled to Hämeenlinna for their last game of the week against HPK.

During the bus ride, my task was to talk through the short physical sessions I mentioned earlier in the week with a few defenders in person. At the same time, I had the opportunity to ask them for feedback on the work I did in physical training - and especially injury prevention training. I emphasized that it is important that the players give as honest feedback as possible. Overall, the feedback was good and all of them felt that they have managed to put together a good warm-up set for themselves from the exercises they did, which is versatile and serves both preparation for games and the development of certain physical characteristics.

Although I didn't gather to have a discussion with almost every player, my own assessment is that there is a somewhat divided approach to injury prevention training within the team. Some of the players understand and embrace the importance of training and try to carry out the exercises as best they can. For some, this process is still in progress.

My tasks related to the game were again short-handed leading a game-related meeting and searching for and selecting video clips related to the meeting.

During the game, my task with the defenders was again the same as in previous games, but on Sunday I tried to emphasize the positive atmosphere through feedback and encourage the players to have a confident feeling of performance. The week has been physically difficult for the whole team and the results of the games have not been as desired. Because of this, the

entire coaching staff felt that creating a positive and encouraging atmosphere for Sunday is important.

Still, mental and physical fatigue was visible in part of the game performance, and defensive play was poor in places. Despite this, the team's strong foundation for the game was visible on Sunday, and the result was a 1-5 victory for the Pelicans.

Weekly analysis 8.

My professional development during the eighth week of observation came largely in the form of training planning, performance optimization, and observing the players' physical and mental performance and recovery.

As stated in the previous weekly analysis, the eighth observation week together with the week after it, contains six game events. For this reason, I reduced the CNS based high intensity training load. On a practical level, the speed strength period lasting 4-5 weeks was interrupted after three weeks of training and partially changed to a deloading week where intensity as well as volume of high intensity training was decreased. The plan was to continue the speed strength period for another two weeks after a two-week break. In addition to other physical stresses, ice training and especially game events include a large number of sprints and quick changes of direction, which can be read as speed and plyometric activities (Kellmann, Beckmann 2018, 313.) Activity like this strains the central nervous system, and it takes time to recover from fatigue like this (Bott, 2017.) Due to this, clear high intensity off-ice exercises were reduced. Monitoring the recovery state of an individual player is a very complicated process, which is almost impossible to follow comprehensively in terms of financial and time resources in the current situation. However, the coach should be aware that, according to several sources, recovery largely determines successful training, performance level in games, and the risk of injury in all physical sports activities. (Kellmann, Beckmann 2018, 319.) During the week, I focused on observing the players' performance in practice, looking for physical signs of fatigue. I also asked the players, together with the rest of the coaches, significantly more questions about their physical and mental state than normal, and we encouraged them to tell us if there were any abnormal states. According to answers of the players we were able to instruct the three players on their own exercises and routines for the minor pain conditions they experienced in the middle of the week. As a measure to ensure a good recovery, I also held a meeting for the players about recovery management during the competition season. In the meeting,

I went through points about the importance of nutrition and rest in terms of recovery. As practical measures for monitoring recovery in the future, I have thought some minimum practical requirements for myself based on the information I received from the literature, which I can implement with limited resources and limited time. In the future, I plan to calculate more precisely the workload that appears in the exercises every week and compare it with the recommendations in the literature. At the same time, the players' own monitoring about weights they use, and its development must be continued. Weekly weighing on a scale also provides indicative information on development and nutrition. In addition to these, I have planned to introduce a weekly survey related to athletes' mental state, which could be used to measure the players' recovery in addition to physical side of things. I still haven't decided exactly what kind of questions will be added to the survey, and in which environment the players will be able to complete the survey so that the survey is valid and reliable but this idea I must introduce first for the other coaches of my team and I must ask their opinions about it. In any case, recovery monitoring is one aspect of coaching that has been highlighted during the monitoring period, and I think it would be good to take future measures in this area in our team.

During the week, I noticed once again the concept of game performance versus development of physical characteristics. That as the coach moves to the upper age groups, the importance of winning in competitive team is increasingly present in team environment, optimizing game performance during the competition season must be emphasized from time to time. However, it must be kept in mind that, especially in age groups where the players are still growing, such as in the U-18 series, the year-round overall development of the player is the focus (Hakkarainen 2014.) The ongoing two-week period can be considered a special one, as the six games were originally supposed to be spread over a three-week period, but for practical reasons the games had to be moved at short notice and condensed into two weeks.

In our team environment the players receive a lot of information about development in terms of ice hockey from different sources. It's important to me to make players understand and appreciate all the measures related injury prevention. The same applies to developmental training. When it comes to developmental year around training, it helps that results of developmental training is easier to measure via regular physical testing. Understanding these issues for growing athletes does not happen overnight. Related to the topic, in terms of my own development, I must be patient and clear in my daily work, and I must not get frustrated, even if I sometimes have to repeat myself during practice events. In the past, I have learned to understand the importance of training to prevent injuries only when injuries have already occurred. My job is to create this same understanding for athletes before injuries occur.

4 Discussion

Developing as a physical trainer is a long process, and the eight-week Observation period was a relatively short part of this process. Nevertheless, during the eight-week observation period, I noticed that I focused in a new way on my daily work, especially in terms of injury prevention and year-round physical development. Through my own concentration, themes important to my work came up repeatedly, to which I learned to direct my own thoughts and time.

A major recurring theme that I found myself focusing was programming training into a weekly rhythm for a competitive sports team where winning is valued. In the past weeks, I learned to pay more attention to the players' in-season recovery process, which, based on the literature, turned out to be a surprisingly multidimensional thing. I have learned patience through literature and my own experiences related to the themes of work during the eight weeks. In addition I have realized that especially from the point of view of preventing injuries, I also have to start taking action. Before the beginning of the thesis process, I recognized a shortcoming in our team's activities related to recovery monitoring, but despite that, not much practical action was done besides planning. During the observation period, I began to take more and more practical measures in monitoring the recovery, and I began to plan measures for the future as well.

During the process, I also gained a lot of self-confidence to carry out practical exercises, and discussions with coaching colleagues in the same field, as well as delving into the literature on physical training, confirmed my idea that the content of physical training in the Pelicans U-18 team develops an individual's physical qualities, and effectively prevents injuries caused by overexertion. Overall, I feel that my extensive coaching skills related to longer term process of training of the physical training process developed during the eight weeks. The challenges related to the content of the single training event and leading the single training session did not come up repeatedly, but I still got good information from other physical trainers and literature regarding the conduct of the individual training session.

I found practical solutions to the challenges that arose during the observation period from discussions and literature. Sharing of training content between physical trainers from different teams was a practical measure I took into action. This helps to expand the content of the exercises, which in turn increases the variety and interest of the training for the players. I haven't done much of this before but have developed the content of the team's training mainly by myself and using written sources. By delving deeper into the training model created by Hakkarainen that we use in the club, I understood how in practice weekly programming can be supported in our operating environment by combining exercises. Combining different physical components into one workout during busy weeks was highlighted especially during the speed strength

period. In relation to injury prevention and recovery, a physical questionnaire emerged at the level of the plan, the development of which is still ongoing at the end of the observation period. However, as a practical measure during the observation period, I started to map the physical fatigue of the players by asking about their physical condition and developing own training routines for the players based on the answers. With the help of this method, off-ice physical training can meet the needs of the individual better, and the risk of injury during training sessions is reduced. For example, a player suffering from pain conditions in the hip flexors can be prescribed extra exercises specifically aimed at the hip area, and his speed training can be temporarily modified to a form that is less stressful on the hip flexors.

During the writing of the thesis in diary format, I learned to pay more attention to the recurring challenges that arose repeatedly. Weekly planning was one of the recurring themes that I hadn't given much thought to before the writing process began. Knowing this means to me that more attention should be paid to these things in the future, and these things are very important in terms of year-round physical development and injury prevention. Especially the book *Sport, Recovery, and Performance: Interdisciplinary Insight* by Kellmann and Beckmann (2017) emphasized the importance of monitoring and implementing recovery in terms of development and injury prevention. Writing a diary also taught me to reflect on my own actions and decisions during the weeks even better. If there were challenges related to my work, I learned to react to them more effectively and faster than before the beginning of the writing process, which is a clear advantage that followed through writing. From the weekly analyses I have written, I also think there is a noticeable development in evaluating my own activities from the point of view of professional development. In the beginning, I found it challenging to write about my weeks from the point of view of development, and I found myself describing and justifying things from outside my own development. During the work, I felt that I developed in the reflection of my own actions in this regard.

Analyzing my work has helped me to find optimal development targets for myself in my everyday life as a physical trainer. Before starting the thesis, I spent a lot of time and concentration on planning single training sessions and planning the movements players could perform. A more detailed analysis showed that during the eight weeks, the issues related to the content of the individual training did not become a challenge, but rather the broad entirety of the training process and how physical training is combined with other aspects of the ice hockey team's activities and recovery. For the future, a clear development target remains the monitoring of recovery and the implementation of follow-up. In my opinion, this goal should also be implemented at club level. Correct operating methods and implementation on behalf of financial and human resources require a more detailed analysis. Better communication with the players

about the reasons and benefits of injury-preventing training, as well as creating a motivating atmosphere for these training sessions, remains a future development target. In the future, I also see giving better attention to the needs of individuals within the team, as a challenge that supports injury prevention and year-round development. In connection with this, I took practical measures by developing my own routine programs for the players already during the observation period, but in the coming years it would be good to do this already at an earlier stage of the season. The same consideration should also be made in other types of exercise, if possible, for example in plyometric exercises. The last thing that was presented during the follow-up period was the optimization of planning. Practice times can be challenging, games during the season can affect the feasibility of physical exercises, and daily practice time before becoming a professional is limited. That's why careful long-term planning and the weekly programming effectively facilitates the realization of physical training in the desired way.

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