



Manual for Practicing Rhythm in Sports

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Abstract

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<p>The importance of rhythm in physical activity and sports participation is highlighted in this thesis. Telling about the children's need for fun, engaging, and challenging activities. The thesis bridges the gap between holistic development, encompassing motor skills, cognitive progress, and social-emotional growth. They all affect to rhythmic qualities of an individual and support rhythmic learning.</p> <p>The theoretical framework covers information about motor skills learning and physical activity theories. Also, written about stages of skill acquisition where cognitive, associative, and autonomous learning takes place.</p> <p>After completing theoretical insights, the thesis ends with a practical manual with the potential to transform into a mobile application. Manual offers sports practices for athletes and coaches who participate in any sport. To improve rhythmic capabilities and enhance physical activity. There are ice hockey-specific exercises included in the manual which can be modified for other team sports.</p> <p>The objective was to change theory to practice and develop the training manual during the work placement year.</p> <p>The project timeline covers September 2022 to November 2023, with continuous literature reading and data collection.</p>
Keywords Children, Motor skills, Rhythm

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1 Introduction

Even though my life has revolved around sports since from a young age, I did not hear about rhythm in sports that much. I decided to choose a topic which I am interested to learn more and find more information about. The importance of the topic of rhythm in sports is its timeliness, and it has the potential to change our understanding of athletic development and its components. While we hear a lot about other physical abilities and training methods, rhythm in sports is an underestimated skill and something we can take a closer look at. The thesis offers knowledge based on literature about motor learning and highlights the importance of rhythm in sports. Children should participate in sports activities to improve their overall well-being, motor skills, and rhythmic qualities.

Part of the process was my work- placement year in Abu Dhabi. There was time and space to try different exercises. Agility ladders, game activities, stickhandling, tennis ball throws, and or plyometric training were part of each off-ice practice. The level of the athletes was varying. Children develop at different times, so age and skill level were considered. Some changes in the hockey school were made during the season. The number of practices and games during the week increased. Children started to have more off-ice practices, which is a perfect place to learn motor skills, rhythmic skills, teamwork, overall athletic performance, and psychological benefits such as confidence and social-emotional growth.

The thesis aimed to create a training manual for coaches and athletes to use. Athletes of all ages benefit from the use of the manual. Recognizing rhythm as an important ability is important in the development of skilled and physically active individuals. Practicing should be fun, challenging, and safe. All people interested in sports practice may benefit from both the thesis and the manual. The thesis supports everybody to think about different stages of long-term athletic development and its components. Coaches in sports clubs, teachers in daycare and school, instructors and children's parents can use the manual to get ideas or practical examples for developing individuals' rhythm skills.

2 Motor Skills

Learning motor skills is essential for performing everyday movements and tasks. Motor skills can be categorized into gross and fine motor skills. They play a crucial role in children's physical and cognitive development. Gross motor skills are needed to move our bigger muscle groups. Training gross motor skills improves balance, coordination, reaction time, and physical strength. Fine motor skills are needed to move our smaller muscle groups which are needed to move for example hand, wrist, or ankle. If children and youth lack motor skills, it makes it harder to perform school and sports activities. (Mauro 2022)

Motor skills are trained before puberty, but the development continues throughout the whole lifespan. They are defined as building blocks needed to perform and participate in sports. It is important children participate in activities where they can perform a wide variety of full-body movements. Professionals suggest that athletes participate in a wide range of training activities to promote athletic performance during all stages of development. For example, running, changing direction, and decelerating are crucial skills for achieving proficiency in motor skills. Motor skills affect long-term health and well-being. (Gamble 2008, 103-105) It is important to remember basic motor skills are needed for each sport. They help the individual to switch from one sport-specific skill to another. (Brewer, Dobbins, Greene & Shane 2022, 17)

Motor skills are divided into balance skills, locomotor skills, and manipulative skills. (Jaakola 2021, 16) Genetics and living circumstances affect how an individual learns motor skills. If children do not get enough chances to train motor skills, genetics does not promise progression in motor skills. Children learning new ways to move is a good example of motor skills learning. Equipment and things in the surrounding circumstances usually affect the interest of kids thus they will try more moving patterns. Learning motor skills is fast in children's development because kids are excited to learn by trying and failing. (Jaakola 2021, 25) The more an individual has gained skills, the more efficient and capable the individual's ability to learn new motor skills. New skills are built up on top of previously learned skills. How fast an individual will learn new skills varies. Genetics and biological age affect learning. (Jaakola 2021, 26)

Developmental psychologist Jean Piaget has refined children's development in four categories: sensorimotor (0-2 years), preoperational (2-6 years), concrete developmental phase (7-11 years), and formal operation phase (11-12 years.) According to Piaget's research, cognitive and motor skill learning correlation is best seen in the sensorimotor phase, where kids meet the circumstances by

moving and learning different equipment's names and features. It is said that children during the sensorimotor phase think through moving and motion. (Jaakola 2021, 32-33)

The correlation between cognitive, social-emotional, and motor development is noted in earlier studies. Exercising improves cognitive skills such as alertness, memory, and movement control. Kids and youth who have better motor skills survive better from cognitive skills tests than kids whose motor skills are weaker. It is important to point out from the earlier studies that maintaining physical activity has positive outcomes for school success and test results. The looks and appearance of an individual affect self-esteem. Motor skills go hand in hand with social-emotional development. Sufficient motor skills offer the chance to participate in playing and games which also develops social-emotional skills. Kids who lack motor skills are more often left out of games and plays. One of the main reasons for an individual to be motivated to develop motor skills throughout a lifetime is that humans want to belong or participate in group activities. Previous research also supports the idea that participating in physical activities unwinds both children's and adults' self-esteem and positive self-concept. (Jaakola 2021, 32–33) Regarding the research, it is the appearance of individual and social approval that seems to be the most important factor for the development of positive self-esteem. Both aspects are developed in physical activity. (Jaakola 2021, 33-34) Also, participating in physical activity supports the morale and self-regulation of children and youth. Following the rules are part of the activities. By learning and doing together, children are practicing helping each other and taking other people's feelings into account. Participating in physical activity offers a place to feel different emotions. For example, when children are playing together, they feel the emotion of winning and losing. (Jaakola 2021, 33-34)

2.1 Balance Skills

Balance skills among youth develop before the school age. Living in a physically active atmosphere supports children to be exposed to a wide variety of movements. Physical active circumstances to improve balance skills include for example the opportunity to swing, climb, run, and balance on different obstacles. Physical activity among young children has decreased, and if children do not get previously mentioned experiences, their balance skills are not developed efficiently. Because of this, it is important that in kindergarten kids do activities that support balance skills. (Jaakola 2021, 40)

In our daily tasks balance and coordination both gross motor skills, play essential roles that are needed in our daily tasks. For example, to get dressed in the morning and to participate in sports activities. They are essential skills to be trained throughout childhood. They help for controlled body movement when performing physical activity. Balance helps to keep the body stable while

performing a task. Balance can be divided into two groups, dynamic and static balance. Dynamic balance means keeping balance during body movement. Static balance means that an athlete is staying in a stationary position with control. (Gamble 2008, 31) It is important that kids can control their body movements, to avoid injuries and be comfortable to perform activities. Having a good balance makes life easier and safer because then individuals can participate in various sports and activities meanwhile being comfortable performing the tasks. We need balance for example for walking on slippery surfaces. Balance affects us during our whole lifespan. Balance skills are the first skill to develop in motor skill learning. Having good balance skills allows us to participate in multiple sports. Balance affects elder people, and it is noted that many elder people lack balance, which affects their ability to survive daily tasks. (Jaakola, 2021, 7) Literature suggests the idea that “The base layer of the athleticism pyramid consists of mobility and stability. Mobility is the active range of motion for functional movements, and stability is the ability to maintain posture and balance during athletic movement.” (Gamble 2008) According to Jaakola balance skills are crucial for maintaining balance. Balance skills include turning, extending, bending, rolling over, swinging, upside-down movements, stopping, landing, evading, and balancing.

Jaakola's (2021, 34) book offers exercises and structured plans for developing balance skills. The exercises can be used for instructing, teaching, and coaching sports for all ages. The exercises are also appropriate for physical education lessons to activate students in the classroom environment. These activities can also be used for individual training to improve balance skills. The examples from the book are simple and there is no need for the use of special equipment to practice. The example practices can be practiced with own body weight. There are also multiple tools and equipment to improve balance. This equipment is usually very simple and cheap. The most common equipment to improve balance is a balance board, balance pillow, bosuball, trampoline, and exercise ball. (Jaakola 2021, 34)

There are games and activities which improve coordination and balance such as walking on unstable surfaces, animal movements, yoga, and playing catch. (Miracle Recreation, 2023)

To improve balance skills among small kids, they need versatile circumstances where physical activity is possible. Children move naturally if they have the opportunity for that. Next, we look at some activities that can be used to instruct kids which challenge their balance. (Jaakola 2021, 41) The activities can be, for example, walking on toes or heels, walking backward and sideways, jumping, and walking ball between legs. Walking on a low squat position. Jumping on a trampoline improves athletes to learn how to control their movement and supports dynamic stability and landing technique. Standing on hands and or on the head is also preferred to improve balance

skills. While maintaining these exercises safety needs to be taken into consideration. Pillows or soft surfaces are recommended. (Jaakola 2021, 41) Different types of standing positions are well known to improve balance skills such as standing on one leg, Tandem standing (feet one after the other), one leg standing to reach forward, and different directions. (Jaakola 2021, 36-37)

Motor skills and strength affect the ability to control balance and maintain posture. The strength of the ankle and feet affects how an individual can activate and control the movement. The correction movements start many times from the multiple muscles that surround the ankle and feet. They are not the only muscles that affect balance. The kinetic chain plays a big part in the regulation of the whole motor system. The knee and hip joints with back, hip, and shoulder muscles also play a significant role in balance. The skill level of an individual affects how well he or she uses the body to maintain balance. If an individual has multiple experiences of physical activity and has sufficient motor skills, he or she can coordinate effectively different body parts to make corrections on body balance. Maximal strength and speed affect how quickly an individual can make correction movements and maintain balance. Motor skills and strength qualities of an individual usually weaken when growing older, which affects balance. Training motor skills and being physically active seems to be key for slowing down the process of weakening. (Jaakola 2021, 31)

2.2 Locomotor Skills

Children learn locomotor skills from early childhood. Skills progress from crawling to walking, and after that to more complex movements such as jumping, leaping, and running. Other examples of locomotor skills are climbing, galloping, sliding, and hopping. Most locomotion skills are developed by approximately 7-10 years of age. These skills are trained when children participate in age-appropriate training programs. plyometric training is an effective training stimulus to improve locomotive skills overall. Developing strength and power and incorporating exercises that improve muscular strength helps to perform locomotive tasks in a better way. (Lloyd & Oliver, 2020, 109)

Walking is needed in many sports activities for example in golf. Practicing locomotor skills should be fun and kids should have time to explore. Babies learn to walk approximately at 1 year old, jump at age 2, and master more complex skills at age 3. (Holecko 12.2.2021) Like other skills learning locomotor skills should be fun for the children. They need freedom and space to explore. It is recommended that preschool and daycare offer enough possibilities for these types of activities. To learn locomotor skills, the activities can be very simple such as following the leader and the red light-greenlight game. Also, showing exercises such as speed up or slow down, swinging arms, tip-toe walks, and swinging legs are recommended. Relay races are something that most kids love. They like to compete against each other and move as fast as they can. (Holecko 12.2.2021)

Running is an important skill to learn. Most sports activities include moving from one place to another by running. For example, in tennis or rugby. The earlier studies point out that running skills among youth have decreased. Many teachers say some kids cannot run because they do not have sufficient balance, rhythmic, and physical capabilities. Because of this kids and youth should expose to running and systematic development. (Jaakola 2021, 39) Running is an important skill for cognitive and social development because when kids are running, they develop their cognitive skills and develop their thinking habits. (Jaakola 2021, 39) Increased engagement in running activities correlates positively with the advancement of running skills in children. It is noted that children 3-4 years old have already big differences in the amount of daily physical activity. Some kids are not exposed enough to sports activities to enhance their running skills. Instructors, coaches, and teachers need to foster a playful learning environment and implement learning strategies to support locomotor skill learning and active lifestyle. (Jaakola 2021, 47) Jaakola states that primary school is a good time to teach locomotor skills such as running. Moving by running is a natural way of moving for the kids. They do not need much motivation from outside to move. It is vital to offer circumstances for the kids where they can run. (Jaakola 2021, 62)

Learning locomotor skills happen through fun activities. It is recommended to let children run without shoes to activate the small muscles from the feet and get better contact with the surface compared to if they run with shoes. There are cues that educators, teachers, instructors, and coaches can use when teaching the kids. Cues and imagery can be used while children are performing activities such as tag. "Run proudly" Cue can be used to support individuals to control the core while running. "Pins on the heel" Cue can be used to support children to run with their ball of the foot. "Running on the hot surface" Cue can be used to support children to have less contact time on the surface which leads to faster running. (Jaakola 2021, 62-64) Later when kids grow older the activities mustn't be too boring or simple. excitement is an important part of children's development to support motivation so that children try new exercises and participate in activities. Keys to favor inner motivation in children's educators, instructors, teachers, and coaches must offer a chance for the kids to select from the exercises that they want to try and motivate children to try and give individual feedback for them. (Jaakola 2021, 78-79)

2.3 Manipulative Skills

Manipulative skills are an important part of children's development and physical education. Developing manipulative skills is important for multiple reasons. Training manipulation skills develop overall fitness levels, hand-eye coordination, balance, and locomotor skills. They help individuals gain or maintain physical literacy and are a fundamental component for promoting

lifelong engagement in physical activities. By training manipulative skills, individuals can achieve physical literacy and learn essential skills to participate in sports activities. “Manipulative skills are a key component of many sports and activities.” (Charette, 2023)

Manipulative skills and their effect on self-confidence, coordination, and working in a team environment are also highlighted in the previous research. They also, support motor skills learning such as coordination, balance, and dexterity. Learning manipulative skills includes both gross & and fine motor skills. (Charette, 2023)

Manipulative skills are needed to join sports activities such as ice hockey, basketball, football, or tennis. (Government of Western Australia 2014) defines manipulative skills as next. “Movement skills that require an ability to handle an object or piece of equipment with control.” In many sports, an individual needs these skills to handle the ball, puck, or other game equipment. Exercising manipulative skills supports learners to develop object control skills. Manipulative skills “involve the ability to handle and control objects with precision, accuracy, and fluidity.” This means for example in ice hockey, the learner needs to learn how to shoot a puck accurately or control the speed of dribbling. They can also learn how to receive a pass in ice hockey or football with control. In physical activities, manipulative skills are for example – pushing, catching, bouncing, and dribbling. In the world of ice hockey receiving, passing, shooting, and dribbling skills are important.

Other examples of manipulative skills are for example throwing, kicking, pushing, hitting, and bouncing. (Jaakola 2021, 21) Learning to handle objects is like performing the skill and moving with confidence. Manipulative skills impact on hand-eye coordination. Hand-eye coordination is needed to shoot a target or catch a ball. (Charrette 2023)

Manipulative skills impact the way an individual thinks about him or herself is also one thing to mention. Charrette states that “Manipulative skills in PE can help students to develop their confidence and self-esteem.” When an individual gets a feeling of winning or performing the skill well, they can feel a sense of achievement. This helps boost confidence and support learning and continuing to participate in physical activity.

Previous research has pointed out that throwing and catching skills among youth have weakened significantly. Throwing and catching are essential skills to learn. Children need the opportunity to throw balls to learn to throw. Throwing and catching can be practiced safely. Throwing is an important skill to learn to participate in ball games such as basketball, tennis, padel, or football. (Jaakola 2021, 163-164) Learning how to catch happens later to be compared to other motor-

skills. It is a complex skill to learn. Catching needs cooperation from both senses of sight and motor- skills. (Jaakola 2021, 227)

It needs careful planning and instruction to teach manipulative skills. It is recommended to start from the basics when teaching a new skill. The skill level of the learner must be considered. Learners should be able to perform and participate in the activity and feel the emotion of success. Also, coaches, instructors, and teachers must be patient when teaching skills because individuals are learning at their own pace. The learning experience should be fun and engaging for the individual. Adults, instructors, friends, teachers, or coaches can show a demonstration of the movement for the children so that they see visual reference to follow. Key points for teaching can be for example 1st proper grip from the stick, ball, or other equipment and 2nd key point, for example, arm movement.

It is recommended to have and use different types of equipment, and balls when teaching. Applying small-sided games to the teaching lesson is recommended. The learned skills can then be used in real sports situations.

Feedback is in big part of learning and teachers, instructors and coaches should encourage children to try and give corrective feedback if needed to support the learning. As individuals might not learn one skill in one session, they need to review the skills again. (Charrette 2023)

3 Skill Acquisition

Skill acquisition can be anything from learning how to run, shoot a basketball, or learning how to skate. Motor learning and control play an important role in sports performance. "Skill acquisition refers to voluntary control over movements of joints and body segments in an effort to solve a motor skill problem and achieve a task or goal." (Singh 2023) There are three different stages of learning which are, cognitive, associative, and autonomous. "Stages of learning consider the process of how a performer transitions from an unskilled novice to an expert for a given motor skill." (Shaw 11.3.2022) After the individual starts the learning process, we can see progression in the movement patterns and how the individual performs the new skill. Learning happens usually through the cognitive stage to the associative, and forward to the autonomous stage. The important thing to mention is that elite performers who have reached already the autonomous stage, may go back and learn skills and gain better performance by visiting the earlier stages of learning.

During the cognitive stage of learning the individual is trying to find out what to do. According to Fitts & Posner's three-stage model "The theory suggests learners attempt to cognitively understand the requirements and parameters of movements." (Shaw 11.3.2022) Cognitive refers to understanding things and mental processes an individual is going through. Individuals might go through self-talk such as how should he or she use their arms while executing the skill or how to hold the stick. During this cognitive stage, learning is usually very fast compared to the next stages of learning. (Shaw 11.3.2022)

During the associative stage of learning "Performer is learning how to perform the skill well and how to adapt the skill." (Shaw 11.3.2022) During this stage, the individual is changing the earlier question from what to do to how to do it. Compared to the cognitive stage of learning, the associative stage of learning asks for the same qualities from the individual but with less thinking. During this stage, learners can focus more on the environment to move efficiently, read the opponents' moving, or see the target.

Some individuals might stay on the associative level and not reach the autonomous stage if there is not enough practice happening in skill development. (Shaw 11.3.2022)

During the autonomous stage of learning the individual not anymore need to think at all or the thinking is minimal while performing the skill or task. "A key to success in mastering basketball skills, as well as many other sports skills, is developing muscle memory." (Brewer, etc. 2022, 17) Motor tasks can be included in the long-term memory by training enough and doing enough

repetitions. “As muscle memory is gained, you no longer need conscious effort to perform the motor skill, increasing efficiency in movement.” (Brewer, etc. 2022, 17)

Motor skills can be evaluated by proficiency and performance. It is important to evaluate athletes by proficiency, not performance especially when the individual starts the learning process. Proficiency means the technical quality of a shot, throw, or kick. Performance is telling us how long the shot or throw went or how hard the kick was. For an individual to become physically literate athlete with motor skill competence, simple movements need to be learned through repetitions. It is suggested to train skills such as balance, stability, awareness, and movements with different speeds. Later it is possible to train more complex movements on higher levels of technical skills needed. (Gamble 2008, 103-105)

When planning workouts targeting to develop athletes' motor skills exercises must be challenging, and fun and allow time and space to explore. Practices should engage athletes. Example practices can be obstacle courses, partner challenges, or gymnastics activities for example. To make sure athletes are learning there should be simple exercises incorporated also, the instructor must show demonstrations and give cues and feedback if needed. Activities should prepare kids to later move to more advanced training such as weightlifting or sport-specific speed and agility exercises. (Radnor etc. 2020, 54-55)

Body management exercises such as animal shape movements, game activities, obstacle courses, and resistance training can be used to teach athletic motor skill competencies. The instructor must give effective feedback and verbal cues to the learners. Feedback and or verbal cues can help the athlete to correct or improve the movement. (Radnor etc. 2020, 67)

“Increasing muscle and connective tissue strength should be viewed as an important adjunct to developing coordination and overall motor skill competency.” (Radnor etc. 2020) Progression in skill acquisition can be noticed as improved performance and harmonized movement. Also maintaining the skill and applying it in other circumstances such as game-like situations is important. Maintaining the skill means that an individual can use the learned skill during his or her lifespan. After the skill is learned the performance is more efficient and smoother. (Jaakola 2021, 23)

4 Rhythm in Sports

Rhythm in life and sports is important. We speak, eat, and walk in rhythm. Our heart beats in rhythm and we run in rhythm. Rhythm plays a big role in most of the physical activities we do or see. In sports, teams attack in rhythm and play in rhythm. Individual players need to have skills to carry the game equipment while moving, passing, or shooting. "Rhythmical movement seems to be the key for developing and maintaining sport-related skills." (Brewer etc. 2022, 2)

Athletes who lack rhythm have a harder time participating in their sport. It means for example that an ice hockey player cannot skate and handle the puck at the same time because the hands and legs are doing different things at the same time. "For one to perform a correct sport skill one must move efficiently; therefore, rhythm is the force that dictates the quality of the skill being performed." (Brewer etc. 2022, 2)

If an athlete is lacking rhythm he or she cannot perform well in his/her sport. When we look at athletes competing in a game situation, they make it look easy many times, but even though they might have some natural abilities, they have been practicing a lot. "The most skillful athletes across all sports move with a sense of grace, coordination, and rhythm." (The Rise Lab Blog 18.11.2019) Athletes must have the skill to handle the ball, puck, or other playing equipment at the same time while moving. "Most sports skills are performed while moving, thus processing a rhythmical quality. Solid execution of these skills requires good rhythm." (Brewer, etc. 2022, 2)

Rhythm and timing are crucial in athletic performance. Athletes need a lot of training and after that, it becomes natural to perform the skills in a good rhythm. "A key to success in mastering basketball skills, as well as many other sports skills, is developing muscle memory. Muscle memory is committing a motor task to long-term memory and is gained through repetition. As muscle memory is gained, you no longer need conscious effort to perform the motor skill, increasing efficiency in movement." (Brewer etc. 2022, 17)

Athletes need rhythm also in running. The most important thing is rhythm in running, which means that the limbs and muscles work coordinated and together. (Jaakola 2021, 40)

The picture describes the things that affect rhythm in sports and things to consider when teaching or learning rhythm in sports. Rhythm is a complex thing, and many things need to be considered when teaching or learning it. Circumstances, age, skill-level, motivation, and proper equipment all affect learning.

More about rhythm and learning components can be seen from the picture.

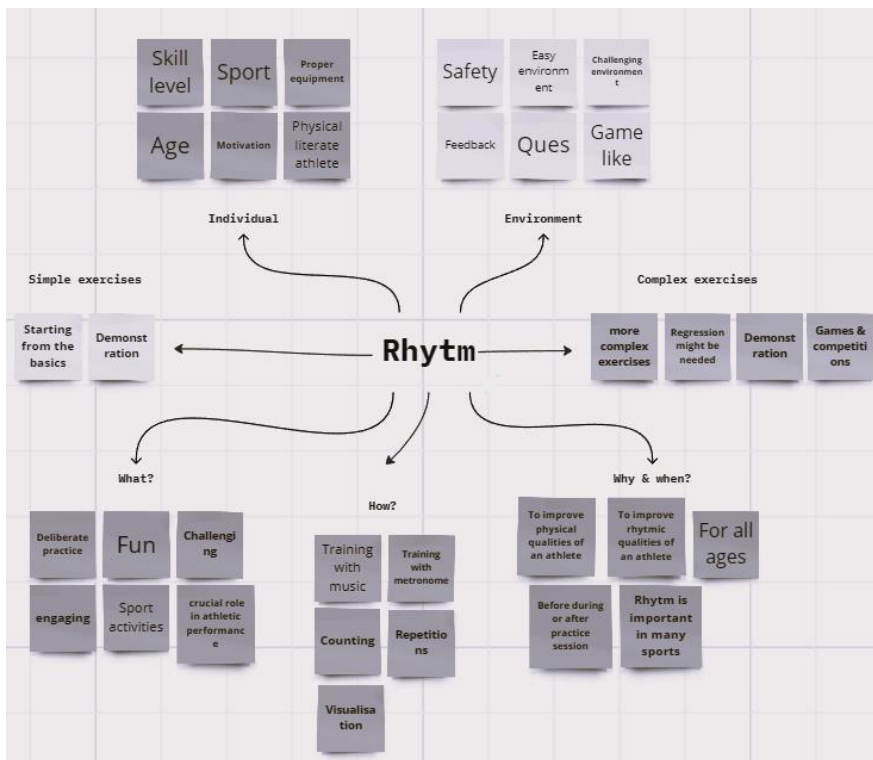


Figure 1: Teaching rhythm in sports.

fitness and skill level of the athlete needs to be considered but age is not so important determinant when selecting or planning the exercises for practicing rhythm in sports. Good movement flow is important because it affects the heart rate level and learners can gain cardiorespiratory benefits from the practice. Performing rhythmic exercises individuals can practice with music "The step patterns must be connected to the music and also to one another, so they are performed without any interruptions or brakes." (Rhythm practicing can be categorized as aerobic exercise when it is done efficiently. Evaluating rhythm may be looked at in many ways. For example, an athlete lacking rhythm may look like he or she is not having good timing. "The best way to evaluate a routine for continuous movement is to practice performing it to the music." (Brewer etc. 2022, 15)

Teaching tips for practicing rhythm in sports:

- Break practice into parts
- Put music later, not straight away to make it easier.
- Slowly at first
- Effective cueing
- Repeat to gain muscle memory (Brewer, Dobbins, Greene & Shane 2022, 17)

5 The aims of the project

The project aimed to develop a training manual for coaches and athletes across various sports to use. Part of the process was the work- placement year in Abu Dhabi, where we had a chance to coach children both off-ice and on-ice. We wanted to plan practices that were fun, engaging, and challenging for the participants. Skill levels among youth vary so part of the planning was that activities are done in small groups to make sure participants get enough feedback and repetitions. The aim was to create a manual that children from all sports can benefit from. The essential objective was to create a manual that enhances athletic performance and rhythmic qualities of the athletes. Integrating the research findings into the manual was aimed also.

As the literature suggests that effective training needs to be fun, challenging, and engaging, we decided to create a practice manual for training rhythm in sports. The manual can later be transformed into a training app. The manual is designed for coaches and athletes. The benefit of using the training manual is that athletes can improve their rhythmic abilities save time and have deliberate practice at home or anywhere there is space. We aimed to Integrate research findings into the manual to ensure it goes hand in hand with other advancements and methodologies in sports training.

Manual offers:

- Time efficient deliberate practice: Athletes can optimize their training time and quality.
- Ensuring that training sessions are purposeful and targeted.
- Interactive learning experience after the manual's content is in video format.
- Keypoints to focus on

6 Project planning

The project planning took time for several months. Also, there were many things we needed to take into consideration. I needed to learn more about the topic and put the theory into practice. During the planning stage, I was talking with other people about the topic and learned from them. I also started to read more about the topic and write theoretical parts of the thesis. Part of the process was IIHF seminars and starting the project of the IIHF Learn to Play program in cooperation with the Abu Dhabi Ice Sports Club. There was knowledge and information regarding off-ice training and on-ice training shared. Also, coaching styles and key points were shared there. It was important knowledge for planning practices and the manual itself. Talking with other coaches coming from different places of the world gave new perspective.

The vision was to develop a training manual for practicing rhythm in sports. With the scope to develop a training manual for coaches and athletes to use. The budget for the project was 0 at this point because planning and discussions did not cost anything. Planning started on 20.9.2022. The manual is digitally made with Excel. It can later be transformed into a video manual or app.

The picture presents the timeline and describes the project planning.

Sep-22	October	Jan-23
Project planning	Theoretical framework	Theoretical framework
Talking with people about the rhythm in sports	Data and literature collection	Reading the material
Brainstorming ideas	Looking for earlier manuals done about the topic	Practical examples of exercises with progressions to Excel

Figure 2: Timeline.

Collecting literature and being critical of the sources was part of the process. There were not many books talking about rhythm in sports. I needed to order books from the USA to get some information. The Internet was a valuable place to get knowledge and data about the topic.

Planning practices and trying new exercises were part of planning the project. Some children did not like the practices, and some did like them. As our goal was to create exercises that are fun, challenging, and enhance physical abilities we made some changes to the practice planning. For example, if we had more coaches, we separated children into smaller groups. When children perform activities in small groups, they get more repetitions and feedback.

7 The implementation of the project

The project needed planning and after that putting the theory into practice. The digital manual was written in Excel. Planning practice plans for kids in Abu Dhabi Ice Sports Club was part of the project implementation. Creating and implementing practice plans for children in Abu Dhabi was challenging and fun. Through teaching sessions, varying levels of motor skills among the children showed up. Also, children to have proper shoes and mindset was something we wanted to teach. The role of rhythmic and motor skills of the individuals was seen clearly in off-ice practices. Those who performed well on off-ice exercises were performing better on ice.

We continued modifying the digital manual using Excel and PowerPoint. We also shared information with other coaches. IIHF started a Learn to Play program in Abu Dhabi and there we gained more knowledge and experience in off-ice and on-ice training.

Our objective for the manual was that it provides structured exercises and enhances athletic performance. The manual provides structured instructions to improve timing, coordination, and overall performance in sports. It includes sample exercises for athletes to use. Athletes and coaches can use the manual to help develop their rhythmic abilities and to better understand the subject. The practice manual can be modified for all sports from beginners- to professionals.

Theoretical framework refers to all literature gained from books, the internet, social media channels, research works, etc. Planning and sharing ideas were happening with other coaches during the whole process. Off-ice and on-ice coaching and testing of the manual have been possible in HDC: Finland training center and in Zayed Sports for joiners of the ice hockey school in Abu Dhabi Ice Sports Club.

The picture describes the implementation of the project from March to May.

March	April	May
Theoretical framework	Theoretical framework	Theoretical framework
Reading the material	Reading the material	Reading the material
Creating PowerPoint	Thesis writing	Thesis writing
LTP Program Organized by IIHF with cooperation of ADISC	Off-ice & on- ice coaching	Off-ice & on- ice coaching
Planning and sharing ideas	Putting plans to practice	Testing the manual

Figure 3: Timeline talking about the implementation of the project.

8 Discussion

The project started in September 2022 and lasted until November 2023. We had the first meeting with my supervisor regarding the thesis on 19.5.2023. We were talking about the thesis topic and what are the next stages of the process. I started to read more about the topic and learn how to write a thesis. Also, more planning and writing were needed. Selecting the topic affected some challenges and finding literature about rhythm in sports was first hard.

2nd meeting was held on Zoom 1.11.2023. During the second meeting feedback regarding the theoretical part and structure was pointed out. The structure and information in the theoretical parts were agreed to be changed. I started to collect more literature about motor skill learning and write about it after the meeting. It was hard to start writing again about new topics, but after all, I am happy that the changes were made. Reading and gaining more information is important for my future career.

3rd meeting was held on Zoom on 22.11.2023. I had made changes to my thesis earlier as my supervisor suggested. I added more references and the structure of the thesis started to make more sense. I received positive feedback and supporting ideas for completing the thesis process. There were a lot of mistakes I made during the process. Project planning and technical issues played a big part in the project but after all, learning was happening through the process. My family and friends were supporting me during the whole process, thanks to them. Thanks to my supervisor he kept me on the right track when talking about the thesis and its structure. Next time I would plan better, to hit a better outcome. The theoretical framework got wider, and it needed complete changes during the process. We included information about motor skills and improved overall the theoretical parts of the thesis. Planning a manual for practicing rhythm in sports was challenging but fun. During the process, I used English a lot. I learned to speak and write in English more efficiently and formally. I also learned to use different sources for the thesis and to be critical of the source material used. After all, I learned how to write a thesis. I got new information about all the topics I read for the thesis, which will later help me in my career.

The manual needs further development, and further suggestions and feedback. Also, the potential to transform into a video manual and app is possible. Video manuals or apps would benefit athletes and coaches because they would see a proper demonstration of the activity from video. Athletes, coaches, teachers, educators, and instructors would probably benefit from using the app by saving time.

Regarding the findings of the thesis, rhythmic abilities can be trained by training motor skills. It is recommended kids, youth and adults play by themselves, compete, and learn skills from each other. It is important to remember there is time and space for kids to explore and use movement

creativity. Learning motor skills is vital. Children's participation in physical activities is important for their physical, cognitive, and social development. Coaches and healthcare professionals need to have an understanding and knowledge, of how, when, and where to teach skills to the children and youth in a healthy, fun, and safe way. Rhythm is a trainable skill and practicing it will lead to a better sports performance. Gaining more knowledge and researching the topic deeper makes it possible to further develop the manual.

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Attachments

Attachment 1 Training manual to improve balance skills

	Balance skills training part 1	Part 2	Part 3
	Different types of standing positions	15-20 meters	Safe area and surface
1	Standing on two feet	1 Walking on toes forwards	1 Playing catch / learners try to catch 1 instructors
		2 Walking on heels forwards	2 Instructors try to catch 2 learners
2	Tandem standing	3 Walking sideways	2-3 selected learners selected try to catch other 3 learners
3	Standing on one leg (if easy one leg controlled squat)	4 Walking backwards	
4	Standing on other leg (if easy one leg controlled squat)	5 Walking low squat position	
5	Stand and reach upwards	6 Running	
6	Stand and reach forwards	7 Running forwards and back	

Yoga and resistance training exercises to improve balance	
1	Stand tall -> Legs hip-width apart, lengthen spine, reach high (hands up together on top of head)
2	Stand tall -> Shift weight to one leg and touch the opposite knee (5+5)
3	Standing position -> Reach forward to toes (5 times per side)
4	Low squat -> Feet pointing slightly outward - lower hips down into a deep squat position - stay down for few seconds and repeat 5-10 times
5	Headstand -> Kneeling position with hands on the ground, place the top of your head on the mat between your hands - walk your legs closer to your hands and raise your legs up.
6	Lunge + upper body rotation (opposite hand opposite leg) 6+6 times
7	Pushups 15-20 times
8	Sit-up 15-20 times
9	Plank 45- 60 seconds
10	Squat 15-20

Attachment 2 Training manual to improve locomotor skills

Practice manual 1		Activity 1: Skipping rope			
Objective	Exercise	Time	Audio/music	Metronome	Intensity colours 1-5
Athlete performs activity 4 times Athlete avoids any pauses during repetitions	1. Freestyle skipping rope	60sec	Freestyle	Freestyle	1
	2. Skipping with two legs	20-30sec	160bpm	140bpm	2
	3. Skipping with one leg	20-30sec	180bpm	150bpm	3
	4. Skipping with two legs (Double spin)	20-30sec	180bpm	160bpm	4
Keypoints	Evaluation;	Yes	No	(Place for video demonstration here)	
Focus on jumping on two legs with balls of the foot	Athlete can /cannot perform the activity				
Surface should be littlebit elastic to avoid overuse injuries or pain	Pauses during repetitions				
Correct shoes	Athlete is ready for more complex workouts				
Open comments / Feedback;					

Activity 2: Ladders					
Objective	Exercise	squares	Audio/music	Metronome	Counting
Athlete performs 7 movements To develop rhythmic and coordination qualities of an athlete To develop overall sports performance Surface should be littlebit elastic to avoid overuse injuries or pain	One leg to each square forwards	10			1 2
	Two legs to each square, left leg first, right follows	10			1 2 3 4
	Jumping with two legs to each square	10			1 2 3 1 2 3
	Jumping with one leg to each square	10			1 2 3 4 5 6 7 8 9 10
	Jumping sideways to each square, legs together	10			1 2 3 4
	Jumping with one leg to each square	10			1 2 3 4
	Two squares forward one square back	10			1 2 3 4 5 6
Keypoints	Evaluation;	Yes	No	(Place for video demonstration here)	
Focus on quality performance	Athlete can/cannot perform the activity				
Athlete can start with slow pace and then add speed	Athlete is doing correctly each movement				
Focus on correct leg and hand movement	Effort level 1-10 (Circle the number)	1 2 3 4 5 6 7 8 9 10			
Step middle of the squares not over the ladders					
Open comments and feedback;					

Practice sample.	Ladders.																																									
Exercise.1.	Exercise.2.	Exercise.3.																																								
(Left leg, right leg) Add 10-15m running if Count 1, 2, 3, 4.	Jump first to yellow square then blue square. Repeat until the end Count 1,2,1,2	Avoid black squares, count to four. Jump on two feet and one feet																																								
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Attachment 3 Training manual to improve manipulative skills

Activity 1	Activity 2	Activity 3
Small size game	Throwing & Catching	Football or basketball dribbling
Learners play handball game	Learners 5-20 meters apart	Pass with partner 10 meters apart
Learners cannot move with the ball	Learners throws the tennis ball for each other	Dribble & pass to partner 20 meter apart

Activity: Stick handling			
Objective	Exercise	Repetitions/ time	Metronome/music
To develop athletes stick- handling skills, coordination, timing and rhythm	1. Freestyle stickhandling	1min	
To develop hand- eye coordination	2. Legs shoulder width part dribbling onfront	1min	110bpm
	3. Sidekicks from one leg to other leg + dribbling	30sec/each side	90bpm
	4. Wide movement forward/backhand		90bpm
	5. Forward backward push + legs moving in rhythm	30sec	90bpm
	6. Freestyle stickhandling and moving around	60 sec	with fast tempo music
Keypoints	Evaluation		
Skating psotion (low stance)	Depending on the level of the athlete..		
Proper grip from the stick	Grip		
Head up while dribbling	Posture		
	Rhytm		
Open comments / feedback;			