

A Parent's Manual to Understanding Long-Term Athletic Development for Ice Hockey

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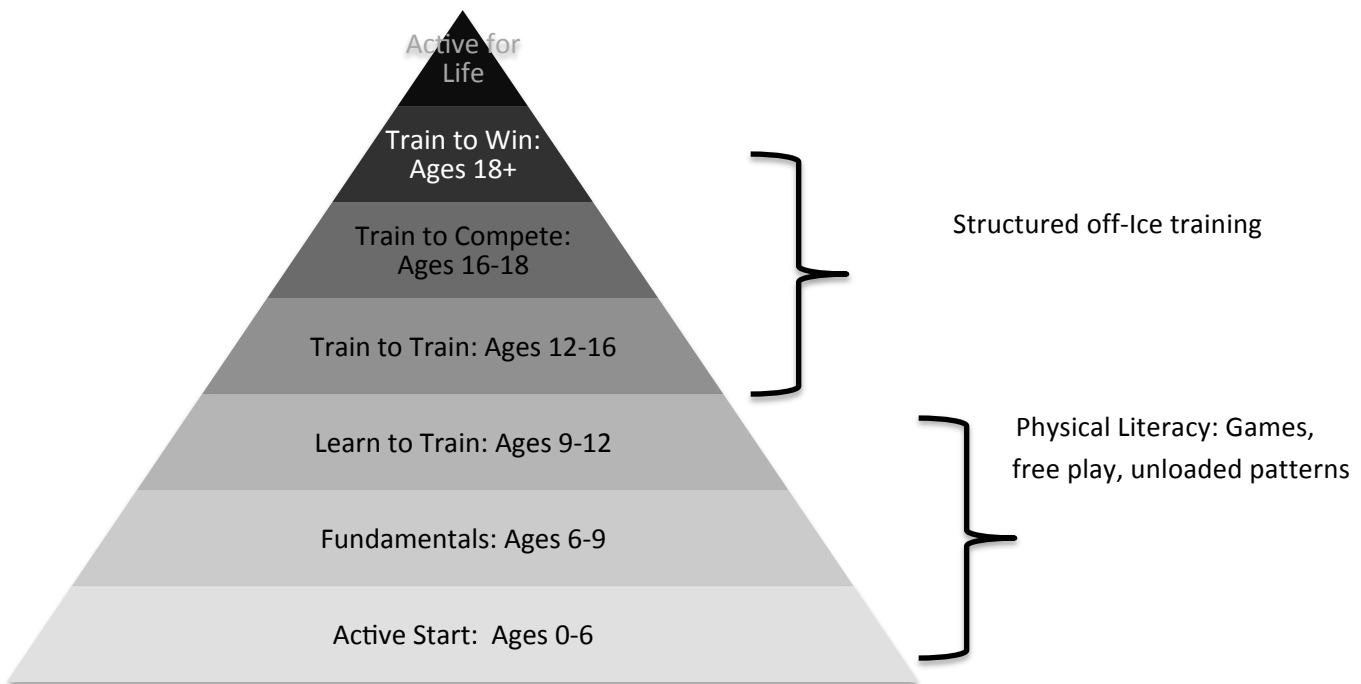
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The game of ice hockey is a game of organized and unorganized chaos. Elite players can reach speeds of up to 30mph, stop, start and change direction on a dime, and possess the unique ability to read and react to the play before it actually occurs. The mastery of these skills, both on and off the ice are of utmost importance. The purpose of this manual is to educate parents of young, aspiring hockey players about the importance of long-term athletic development, particularly the significance of off-ice preparation. USA Hockey refers to long-term athletic development as the ADM (American Development Model), while Hockey Canada uses the mantra Long Term Player development. Whatever verbiage is used, both models attempt to answer the same question.

1.) During the various stages of physical development, what biological windows are open to safely and effectively train?

This manual provides parents with off-ice training guidelines. These guidelines should be implemented during certain periods of physical and emotional growth to maximize athletic potential. It is important to understand that long-term athletic development is not a rigid model, nor an exact science. The best models are malleable, adaptable and ever changing. Science is a body of statements with varying degrees of certainty and by using knowledge from the physical sciences, such as physiology, biology and neural development, one can prescribe general guidelines that aid in performance development while keeping athletes safe, healthy and happy.

Long Term-Athletic Development Model for Ice Hockey



This manual will attempt to explain several components of the long-term athletic development model by breaking down information into user-friendly micro-components.

What: What abilities can be trained at this time? What biological windows are open to training?

Why (aka: “the science”): Why is this important for athletic development? Does the science reinforce this?

How: A menu list of possible training options

Practice Plan: Potential training plans/advice

What to AVOID: Pitfalls, areas of avoidance based on poor information or lack of readiness

Active Start

Ages 0-6 years old

What: This is a time window of exploration. Young boys and girls should be encouraged to experiment through free play and trial-and-error experience. Experimentation leads to increased movement variability, which is critical for a late specialization sport such as ice hockey. The more experience a young child can gain from learning new skills via crawling, walking, throwing, receiving, kicking and tumbling, the more apt they may become in the future of using these skills for complex patterns during sport.

Why (aka: the “science”): “The best time to learn foreign languages, math, music, and other subjects is between one and about twelve years of age.” (1) During fetal development the human brain is under constant construction, producing twice the number of cells it will eventually keep. The goal of early activity is to encourage these cells to “fire” together forming connections in the brain. This enables multiple movement solutions when solving complex problems on the ice. The external environment plays on the brain like a keyboard. A healthy exposure to sensory stimulation is crucial in building long-term athleticism.

How: Free time, unencumbered movement experimentation, introduction to sport, playground games, FUN

Practice Plan: No practice plan needed. Have FUN!

What to AVOID: Do not place adult values on childhood activities. Minimize over-structured, mechanistic practice activities. No speed programs, strength and conditioning, or hockey treadmills needed at this time. Play multiple sports. Engage in FUN activities. Do not force participation. Allow young athletes to learn from their own mistakes without over-coaching.

Fundamentals

Ages Six to Nine

What: This is an important period when emotional ties to the sport are developed. Fun is the name of the game. This is accomplished through off-ice games, multiple repetition, and authentically learning skills through a trial-and-error process.

Why (aka: “the science”): This is a time in which speed can be trained using small, confined games harnessing quickness, agility and coordination. According to sports scientist Istvan Balyi this window occurs between 6-8 for females and ages 7-9 for young boys. (2)

How: Games, games and more games. Allow children to compete in small, confined areas working on starting, stopping, balance, and changing direction.

Practice Plan: Choose 2-3 of the below activities (program prior to, or after practice). Feel free to improvise and be creative. Have FUN!

Circle Tag	https://www.youtube.com/watch?v=7E4P1F80dG0
Linear Relay Race	https://www.youtube.com/watch?v=9uwARNhBdEE
Shuffle Relay Race	https://www.youtube.com/watch?v=d3HG98EQxu4
Bear Crawl Basketball	https://www.youtube.com/watch?v=1lC77arkMQ4
Shadow Drill	https://www.youtube.com/watch?v=l6S-xSDYL7A
Penny Tag	https://www.youtube.com/watch?v=w-WZZci1mJA
4 Corner Relay	https://www.youtube.com/watch?v=IUke7h91ZE5
Tennis Ball Toss	https://www.youtube.com/watch?v=ZPqdascNwml
Tennis Ball Hockey	https://www.youtube.com/watch?v=n3P6btTp1bk
Cone Flip	https://www.youtube.com/watch?v=-0Lc9ZAcPF4
Paper, Rock, Scissors	https://www.youtube.com/watch?v=WLVlmmBVlkQ
PVC Drop	<p>Lean Drop Drive: https://www.youtube.com/watch?v=H9nZZ5lliWM</p> <p>Half Kneeling: https://www.youtube.com/watch?v=2y8E3GG5Ewk</p> <p>Seated Starts: https://www.youtube.com/watch?v=uRXchbFfy64</p>
Tic, Tac, Toe	https://www.youtube.com/watch?v=AYLaOBRezLY

What to AVOID: Avoid structured conditioning. Intense intermittent work should be avoided outside the scope of sport. Energy is stored as glycogen in the human body (in the liver and muscle). Young children have smaller muscles and liver. This equates to a smaller gas tank. In addition, heart volume has not been reached (approximately 11 for girls/14 for boys). This affects the amount of blood the heart can pump. Blood carries oxygen. Do not prescribe mile runs, punishment conditioning, or military-based mental toughness for young, developing children. No speed programs, strength and conditioning, or hockey treadmills needed at this time.

Learn to Train

Ages Nine to Twelve

What: This is a period where motor coordination may effectively be introduced. Basic unloaded patterning such as squatting, hinging, pushing, and pulling may all be formally coached during this stage of physical maturation. In addition, a dynamic warm-up may serve to improve balance, coordination and movement efficiency.

Why (aka: “the science”): “If fundamental motor skill is not developed by this stage, a significant window of opportunity has been lost.” (2) This window, prior to puberty, is where young athletes may be exposed to structured movement training. During the final portions of this period, athletes will start to undergo changes in body composition and initiate puberty

How: Coaches may teach basic, unloaded movement and introduce a dynamic warm-up prior to practice/competition.

Practice Plan: Continue with the games mentioned above; however, prior to engaging in these activities, perform movement-based training, followed by a dynamic warm-up.

Movement Based Patterning (Perform 5-8 repetitions each)	https://www.youtube.com/watch?v=FHWMhSHwAwo
Dynamic Warm-Up	https://www.youtube.com/watch?v=PGMpoCeWKyM
Games	Choose 1-2 games from the list above

What to Avoid: Save your money. Avoid hiring a speed coach, strength coach or fitness professional. Continue to play multiple sports while focusing on becoming a better athlete away from the rink. Prior to puberty, the best way to increase endurance in ANY sport is by improving the economy of basic human movement. Efficiency = the cost of output. Economy minimizes this cost.

Train to Train

Ages Twelve to Sixteen

What: During this developmental window, structured strength and conditioning may start to take place. Structured aerobic exercise may also be introduced as a means of preparation.

Why (aka: “the science”): This window commences with an increase in muscle mass and bone growth. Much of this is due to an anabolic hormone called testosterone. In addition, the growth of both the heart and lungs accelerates, which expands blood volume. The greatest increase in heart volume occurs at approximately eleven years of age for girls, and approximately fourteen years of age for boys. (3) Also, due to the sudden growth of bones, which effect tendons, ligaments, and muscles, there may be an increased need to introduce flexibility as a means of preparation. Many times, the skeletal system grows at an accelerated rate when compared with soft tissue. This may create chronic overuse injuries such as Osgood Schlatter’s disease or various forms of apophysitis.

How: Focus on tissue maintenance with the use of a foam roller. Introduce low, level loading of the basic human movement patters. Increase volume and intensity over time. During the off-season, expose athletes to structured energy-system work. This is the time to hire a strength and conditioning professional.

Practice Plan: Foam Roll, Dynamic warm-up, acceleration, weight training, conditioning.

Movement-Based Patterning	https://www.youtube.com/watch?v=FHWmShwAwo
Dynamic Warm Up	https://www.youtube.com/watch?v=PGMpoCeWkyM
Linear Acceleration For every 10 meters: 60/rest Choose 1 exercise: perform 3-8 reps	Prone: https://www.youtube.com/watch?v=hPPtRUIN6Pc Half Kneeling: https://www.youtube.com/watch?v=pBmDKqOavu8 2-Pt Rolling: https://www.youtube.com/watch?v=hL2-esajaUI
Loaded Movement (Weight Training) 3-5 sets of 6-10 Choose 1 pattern each	Pushing Patterns: https://www.youtube.com/watch?v=6QticglLe8c Pulling Patterns: https://www.youtube.com/watch?v=3rVU_uHHzsY Hip Dominant Patterns: https://www.youtube.com/watch?v=kAlb2b2KG6k Knee Dominant Patterns: https://www.youtube.com/watch?v=dlsan_gNjU
Conditioning	

What to Avoid: Nobody pretends to be a Dr. or a lawyer, but everybody thinks they can coach. Hire a qualified professional with a trained eye. This ensures proper progression, adequate loading and enhances safety. Avoid “hockey specific.” This is a money grab. Develop as an athlete first. Strength is the most important element for young athletes to develop to aid in speed, power and acceleration. GET STRONG FIRST. You can’t shoot a cannon out of a canoe.

Driving more force into the ice = increase in displacement = getting to the puck before the bad guys.

Train to Compete-Train to Win

Ages Sixteen to Eighteen +

What: In terms of development the focus now shifts from general to specific. Training programs become more individualized based on player, position and physical needs.

Why (aka “the science): Once players have been exposed to quality movement and increased training volume, training load may safely be intensified and individualized. Individualization is based on orthopedic evaluation (previous injury), position, type of player, and physical limitations.

How: Specific planning. Hire a qualified professional.

Practice Plan: Below is an example of an in-season program for midget major (U18) hockey players.

Day 1	Tempo	Rest	WK1	G: +/-/=	Reps	WK 2	G: +/-/=	Reps	WK 3	G: +/-/=	Reps	WK 4	G: +/-/=	Reps
A1.) Trap Bar DL	(3/1/0)	:60			x8			x8			x8			x8
	(3/1/0)	:60			x8			x8			x8			x6
					x8			x8			x8			x5
A2.) DB Bench Press	(3/1/0)				x8			x8			x8			x8
	(3/1/0)				x8			x8			x8			x6
A3.) SB Roll Out					x10			x12			x12			x15
					x10			x12			x12			x15
B1.) KB Bat Wing	(2/1/0)	:60			x:25			x:25			x:25			x:35
	(2/1/0)	:60			x:25			x:25			x:25			x:35
B2.) VS Leg Curls	(3/0/0)				x8			x8			x8			x8
	(3/0/0)				x8			x8			x8			x6
B3.) Plank					3x:30			3x:30			3x:30			3x:45

Day 2	Tempo	Rest	WK1	G: +/-/=	Reps	WK 2	G: +/-/=	Reps	WK 3	G: +/-/=	Reps	WK 4	G: +/-/=	Reps
A1.) KB Jump		:60			x5			x5			x5			x5
		:60			x5			x5			x5			x5
A2.) Spiderman					x3			x3			x3			x3
					x3			x3			x3			x3
B1.) VBT: Back Squat (.8-1m/s)	(1/0/0)	:60			x8			x8			x8			x8
	(1/0/0)	:60			x8			x8			x8			x6
					x8			x8			x8			x5
B2.) Shoulder Scaption w/band					x8			x8			x8			x8
					x8			x8			x8			x6
C1.) ISO Chin Up Holds		:60			x:20			x:20			x:25			x:30
		:60			x:20			x:20			x:25			x:30
C2.) Split Squat	(3/0/0)				x8			x8			x8			x8
	(3/0/0)				x8			x8			x8			x6
C3.) Side Plank					3x:30			3x:30			3x:30			3x:45

What to Avoid:

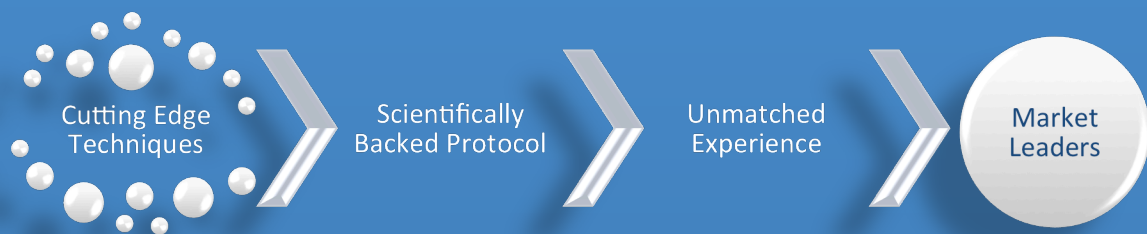
Nobody pretends to be a Dr. or a lawyer, but everybody thinks they can coach. Hiring a qualified professional will ensure proper progression, adequate loading and enhance safety. Once general athleticism has been achieved, programs may now be more appropriately tailored to the individual athlete.

Final Takes for Hockey Parents:

- Children learn from trial-and-error. It is important that during development your child be exposed to a variety of experiences. Hockey is not an early-specialization sport
- Early specialization limits motor variability and restricts motor learning. Too much specialized focus may lead to preprogrammed responses to changing conditions on the ice. In addition, structured time and prepackaged drills in controlled environments inhibit creativity and natural development
- Avoid burn out by exposing your child to summer sports
- The more complicated the skill, the more heavily the athlete relies upon previously learned skills and abilities
- Limitations in movement = limitations in sport
- Young athletes are not miniature adults
- Strength and conditioning should be based on biological readiness. If you do not understand basic mathematics (physical literacy), you cannot perform advanced algebra (weight training)
- Players may select a late-specialization sport when they are between the ages of twelve and fifteen—the later the better
- Structured strength and conditioning for ice hockey should begin between the ages of twelve and fourteen
- Do not dream on behalf of your child
- Redefine performance metrics. Don't keep score during early-childhood development.
- Redefine winning. Focus on improvement and skill development
- Meet emotional needs by being positive and providing mentorship.
- Honor the game, the rules, the officials, and your teammates. Sport is an extension of life
- Have fun! Embrace the journey

References:

- (1) Kotulak, R. *Inside The Brain*, Andrews McMeel Publishing, 1997.
- (2) Balyi, I., Way, R., Higgs, C., *Long-Term Athletic Development, Human Kinetics*, 2013.
- (3) Dick, F., *Sport Training Principles*, Lepus Books, 2013.



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