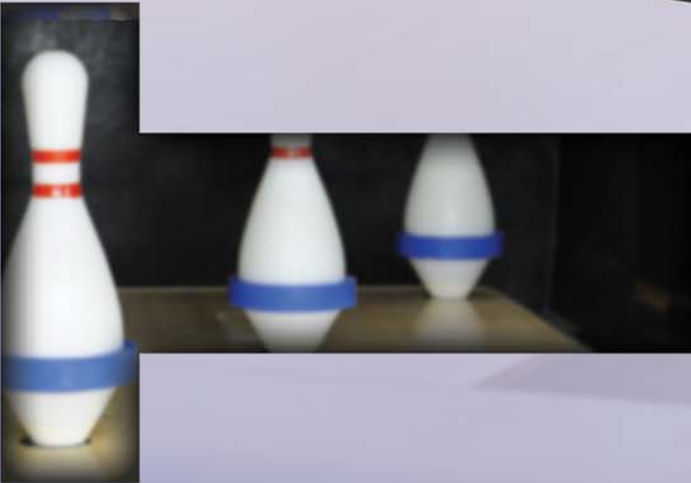


LONG-TERM ATHLETE DEVELOPMENT PLAN FOR BOWLING





February 2010

Long Term Athlete Development (LTAD) is a relatively new concept in Canadian sport. At its heart it is a philosophy which holds that the growth of an athlete must be nourished through specific stages of development, stages which are identified on an individual level. LTAD recognizes that the developmental growth of an individual, not necessarily the individual's age, should be the key marker that guides a sport's support system in providing the opportunity to perfect specific skills before the demands of competition are introduced and winning becomes the expected outcome of participation.

A sport's LTAD plan also provides a framework which enables all its support groups to share a common methodology in guiding the sport's participants, stage by stage, through the necessary steps in training and the development of fundamental sport skills. LTAD helps prevent the common mistakes of previous athlete development models such as early burn out, overtraining and lost potential. Regardless of an individual's ability level, the LTAD plan is an assurance that a well-considered and comprehensive overview of the sport's specific path to development is in place to assist that individual in becoming fluent in the sport, whether at the recreational level, or on the path to the medal platform.

LTAD is the result of considerable research and analysis into athlete development models throughout the world. The Canadian model focuses on the core concept of "a training, competition, and recovery program based upon developmental age – the maturation of an individual – rather than chronological age" but takes into consideration the unique nature of the Canadian sport system and culture.

The Bowling Federation of Canada (BFC), and its members have adopted the philosophy of LTAD and have worked to create a model to meet the developmental needs of its athletes. BFC believes that the implementation of its LTAD plan offers bowling enthusiasts across Canada a comprehensive outline for development and reflects the unique nature of bowling. Our LTAD plan makes clear a consistent and appropriate framework for bowling's support groups to both train athletes reaching for medals, and support recreational-level players throughout the many stages of life.

On behalf of all bowling enthusiasts in Canada, I commend and thank the many volunteers on bowling's LTAD Committee. Their countless hours of research and creativity are outmatched only by their dedication and drive to prepare a plan which will benefit Canadians in our sport for the years to come.

We also thank Sport Canada and Canadian Heritage for their insight and leadership. Their financial support has made our LTAD plan possible.

A handwritten signature in blue ink, appearing to read "Bryan Sargeant". The signature is stylized and written in a cursive-like font.

Bryan Sargeant, President
Bowling Federation of Canada

Acknowledgments

The Bowling Federation of Canada would like to acknowledge the efforts of the following individuals working on the Steering Committee, sharing their time and expertise in the development of this document.

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BOB LATHAM	5 Pin Committee Member	British Columbia
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MARY BLUECHARDT	LTAD Advisor	Ontario
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FRAN CLARK	5 Pin Committee Member	Alberta
RHEAL CHAMPAGNE	5 Pin Committee Member	Ontario
WALTER HEENEY	5 Pin Committee Member	Ontario
ARNIE ROLLINS	Bowl Canada Committee Member	Ontario
ALLEN RYAN	Tenpin, Former LTAD chair	Quebec
MARIA WOOD	5 Pin Committee Member	Alberta

What is Canadian Sport for Life and **LONG TERM ATHLETE DEVELOPMENT?**

Canadian Sport for Life (CS4L) is a framework that encompasses the participation of a whole population in sport from infancy to senior years. CS4L can be divided into three broad areas:

- **Physical Literacy**
- **Active for Life**
- **Excellence**

In this model, all children become physically literate, which lays the foundation for later sport excellence or being active for life.

The CS4L model also shows where athletes pursuing excellence ultimately transition into 'Active for Life' through competitive sport or active recreation.

This LTAD model emphasizes that physical literacy is the foundation for:

- **Being active, healthy and engaged in physical activity for life; and/or**
- **Achieving personal best performances at all levels of competition**

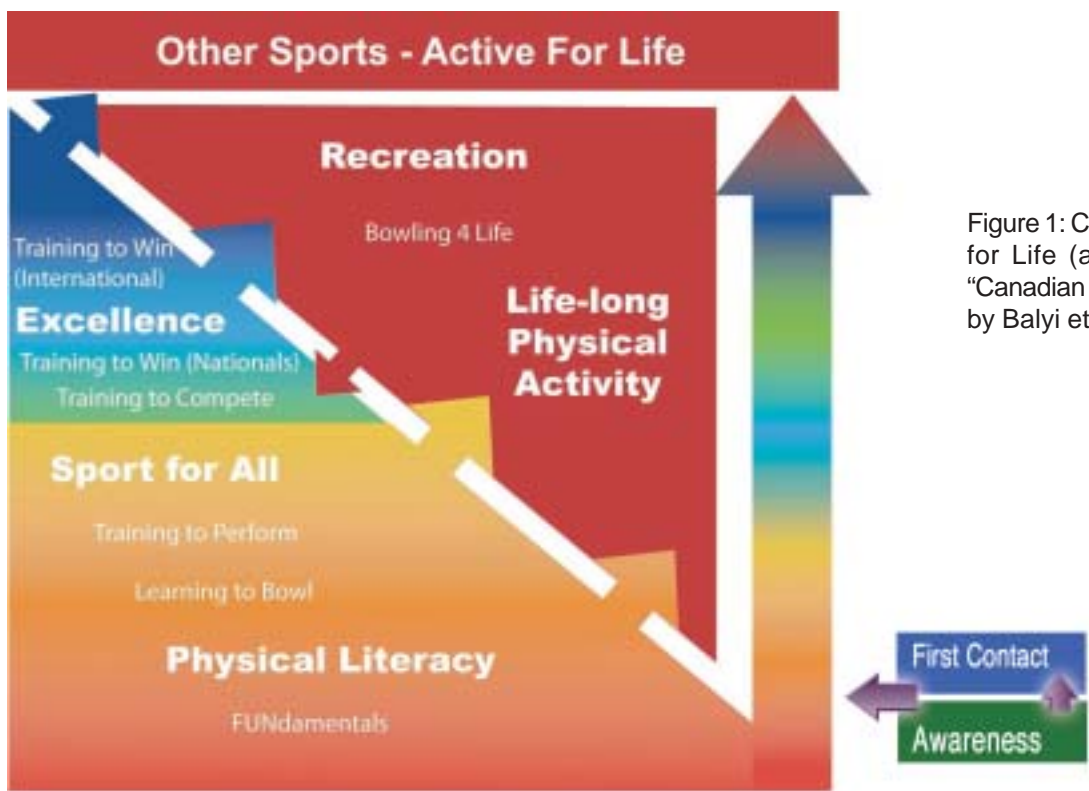


Figure 1: Canadian Sport for Life (adapted from "Canadian Sport for Life", by Balyi et al, 2005)

Two Additional Stages for New Bowlers

These stages apply to all bowlers including people with a disability, new Canadians and/or adults who have never participated in bowling.

Awareness Stage

Bowling opportunities may not be well known to some people. People who are new to Canada, or have disabilities, may have no knowledge of bowling programs that are open and suitable for their participation. The Bowling Federation of Canada (BFC) needs to develop a promotion plan to make their programs better known to those who may be new to bowling.

First Contact/Recruitment Stage

A positive first impression at a bowling centre is critical to create a positive environment for all prospective bowlers including people with a disability. Research has shown that if a person's first experience is not positive, he or she may not return to the sport and to a healthy lifestyle.

Athletes with a disability

Note: Both 5 pin and tenpin bowling are excellent sports for people with disabilities. A number of documents have been written that address specific areas of focus needed when developing programs appropriate for athletes with a disability.

Additional Information on athletes with a disability can be accessed as follows:

Special Olympics Canada (2007) Long-Term Athlete Development for Athletes with an Intellectual Disability; <http://www.specialolympics.ca> and use the appropriate links.

Canadian Sport Centres (2006) No accidental champions...Long-term athlete development for athletes with a disability; <http://www.canadiansportforlife.ca>

CANADIAN SPORT FOR LIFE

- Is a “Made in Canada” approach to athlete development that acknowledges the importance of individual sport culture as well as the Canadian political and social factors that influence athlete development. It recognizes best practices in elite sport and what normative data and research tells us about long-term athlete development.
- Contributes to and promotes a healthy, physically literate nation whose citizens participate in lifelong physical activity.
- Recognizes the need to involve all Canadians in the LTAD process, including athletes with a disability.
- Is an eight-stage model based on the physical, technical, mental, emotional and cognitive development of sport participants. The overarching premise of LTAD is the Active for Life stage encouraging lifelong physical activity.
- Provides ten important factors that shape the sport-specific LTAD model for a logical and healthy approach to athlete development.
- Is a stage-by-stage approach that addresses a bowler’s development in the areas of technical, physical and psychological preparation.
- Acknowledges that fundamental building blocks are critical to the development of a bowler and for the enjoyment of bowling, whether entering at an early age or participating into later years.
- Encourages all sport partners to align all sport infrastructure and resources to meet the needs of sport participants across the entire sport continuum.
- Is an inclusive concept that recognizes the importance of athletes, coaches, officials, administrators, sport scientists, clubs, schools and all levels of government.

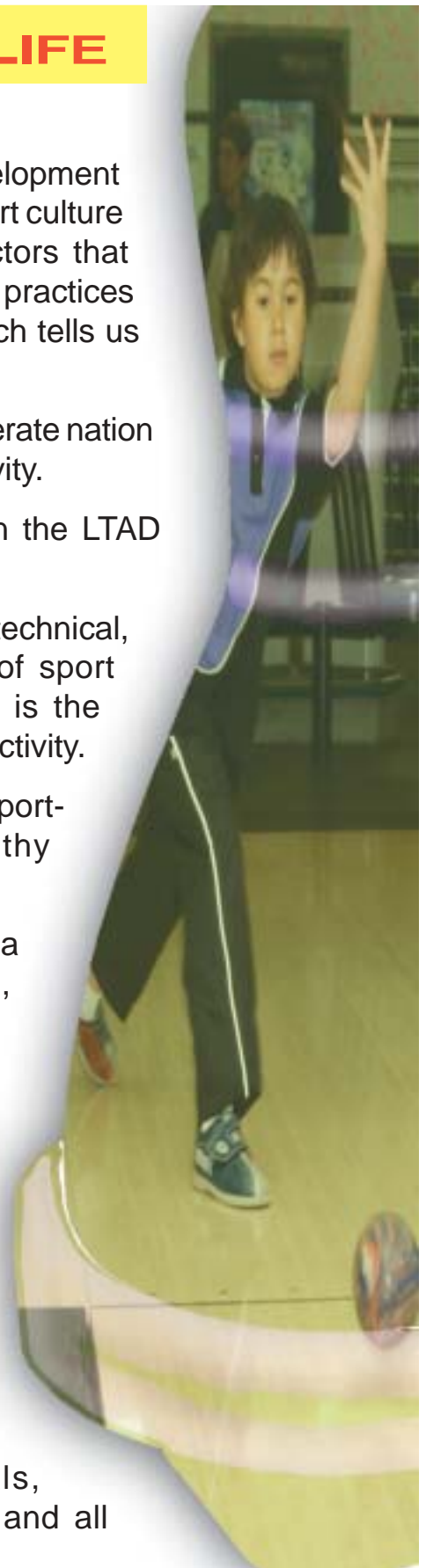




Figure 2:
5 Pin or Tenpin Bowlers

Enjoying Competition for Life

(Adapted and modified from Way & Balyi, 2007)

Figure 2 illustrates the different levels of play: not everyone pursues excellence but many still want to enjoy participation in competition. It is important to note that the majority of bowlers do not reach the national or international level. However, providing fun, meaningful and appropriate competition for each LTAD stage is critical to maintaining a sustainable organization.

Why does Bowling need a CS4L Plan?

Bowling centres cater to people of all ages who have fun participating in a physical activity, often while socializing with friends. But while this sport can be entirely social, it can also be highly competitive at many levels.

Given the current demographics of our Canadian population, CS4L provides the BFC with an opportunity to capitalize on four important trends in Canada.

- 1) As a result of the baby boom Canada has an aging population; the number of people aged 55 to 64 has never been so high at nearly 3.7 million in 2006. As this group continues to age, there is an opportunity to attract the baby boomers into the sport of bowling for health, fitness and fun.
- 2) In Canada, there is an increasing concern about the level of inactivity in children, youth and adults. As the rate of obesity rises and the level of physical activity decreases, healthy bowling programs can provide a fun and social way to stay active.
- 3) According to Statistics Canada (2006), 16.2 percent of the Canadian population is from a visible minority group. In 1991, 9.4 percent of the Canadian population represented visible minority groups. These new Canadians were born in regions other than Europe (<http://www.statcan.gc.ca/daily-quotidien/080402/dq080402a-eng.htm>).
- 4) Aboriginal populations now represent 3.8 percent of the Canadian population, including First Nations groups, Metis and Inuit. Fifty-four percent of this group is now living off reserve and is one of the fastest growing demographics in Canada (<http://www.cbc.ca/canada/story/2008/01/15/aboriginal-stats.html>).

Given some of these trends, how can the BFC and CS4L initiative provide appropriate programs to attract and retain a diverse group of people to participate in fitness activities associated with bowling?

Our Current Shortcomings and Consequences to Bowling

SHORTCOMINGS

Developing bowlers continually compete even in practice. Even practice sessions are turned into competition which increases the games-to-practice ratio.

Adult competition schedules are imposed on younger developing bowlers.

Access to facilities for practice and training is a challenge when trying to increase skill development.

There is little focus on the fitness component and developing physical capacities needed for bowling.

Time is not taken to work on fundamental movement skills during the important skill window in youth bowlers.

There is minimal acceptance of the importance of quality coaching. Furthermore, the best and most knowledgeable coaches work with the elite bowlers.

Very few coaches have knowledge of both bowling and the needs of athletes with a disability.

A system of talent identification and selection does not necessarily identify the best bowlers and provide the best program for them.

Athletes may come to bowling before adolescence and specialize too early.

Many stakeholders involved in bowling do not understand LTAD.

CONSEQUENCES

Developing bowlers do not develop important skills that are necessary to improving performance in tournaments.

Children may not have as much fun participating in adult-type programs as they could if competition were modified based on the characteristics of children and adolescents.

Bowlers have difficulty putting in the hours necessary to become a high performance bowler.

Bowlers in all stages are not developing physical capacities necessary to not only be good bowlers, but to become and remain physically fit.

Bowlers advance without the necessary agility, balance and coordination which are critical to being a successful bowler.

Bowlers may start bowling with a supervisor who does not have the technical knowledge of the sport. Beginner bowlers may develop bad habits that will inhibit their progress and success in bowling.

Bowlers with a disability are being shortchanged as they are not being taught the modifications needed to accommodate their needs.

Talent may not be recognized and there may be fluctuating performances at the national and international levels.

These bowlers may miss the optimal windows of accelerated adaptation including fundamental motor & movement skills, strength, stamina, speed and suppleness.

Without an understanding of LTAD, changes in programs will be challenging.

Unique Characteristics of 5 Pin and Tenpin Bowlers

In 2008, the Canadian 5 Pin Bowlers' Association (C5PBA) and the Canadian Tenpin Federation (CTF) surveyed their membership to examine various trends that may impact recommendations for the implementation of LTAD initiatives.

Why We Participate - Gender Differences

There appears to be a difference between male bowlers and female bowlers regarding their reasons for participating in bowling, whether at the high performance level or at a recreational level. Women are 20 percent more likely than men to value the social aspect of bowling whereas men tend to value the competitive aspect of bowling 12 percent more than women.

Coaching Improves Results

A large percentage of both the 5 pin and tenpin bowlers would like more coaching from a qualified coach: 67 percent from tenpin bowlers and 56 percent of 5 pin bowlers. Of the tenpin bowlers who placed in the top six at Nationals, 88 percent had received coaching from an NCCP-trained coach; of those tenpin bowlers who did not achieve this high performance level, only 27 percent had received coaching. Among the 5 pin bowlers who placed in the top three at the National Championships, 73 percent had received coaching from an NCCP-trained coach compared to 48 percent of those who did not have the strong results at a the National Championship.



Ten Key Factors

that Influence Optimal Athlete Development

The ten key factors that influence an athlete's overall sport development provide a lens for sport organizations to evaluate their programs. Is what we do consistent with these factors? Considering these ten factors, how can BFC make changes to its current programs to attract, develop and retain bowlers?

1

Fundamentals

The mastery of the fundamentals are the building blocks for physical literacy and participation in sport for health or sport excellence.



Figure 3.0 Physical Literacy Leads to An Active Life (Higgs, Balyi and Way 2008)

Figure 3.0 shows that without a strong foundation of fundamental movement skills, a sport participant will have limited options for athletic success in sport and in bowling. Bowling requires balance, coordination, flexibility and hand-eye coordination. An individual lacking these fundamental movement skills may have difficulty achieving his or her potential.

Fundamental movements and skills should be introduced through fun and games. Fundamental sports skills should follow and include basic overall sports skills. Fundamental movement skills should be developed by participating in a variety of sport activities.

FUNDamental movement skills and **FUNDamental sport skills** = **physical literacy**.

Physical literacy refers to competency in movement and sports skills and is best developed before the onset of the adolescent growth spurt; however, it can be improved throughout life.

Programs for older adults should focus on maintaining balance, coordination and flexibility. All programs should work on fundamental movement and sport skills to ensure that everyone is strengthening the building blocks to increase the enjoyment of bowling.

Bowlers with an acquired physical disability may need to re-learn some of the fundamental movement skills. Bowlers with an intellectual disability may take more time to learn certain bowling skills or they may have to be re-taught at the beginning of each week, month or season. In some cases, they may never acquire certain skills.

Specialization

Sports can be classified as either early or late specialization sports. Early specialization sports include artistic and acrobatic sports such as gymnastics, figure skating and diving. These differ from late specialization sports due to the highly complex nature of the motor skills required. These complex skills are more difficult to master if taught after maturation.

Bowling is a late specialization sport. The best bowlers in tenpin in the country and in the world typically range from 35 to 40 years of age. In 5 pin, National Champions range from 25 to 50. Specializing too early in 5 pin or tenpin can lead to injury and burnout.

Children should be participating in a variety of sports to build physical literacy, not focusing early in a late-specialization sport. The bowler's support networks, coaches, parents, and so on, should encourage participation in a wide variety of sports.



Of the respondents in the 2008 C5PBA and CTF survey, 64 percent of the 5 pin bowlers started before the age of 10. Of the top performers, those having placed in the top three at nationals, 66 percent started bowling before age 10. This group also participated in a variety of other sports with 80 percent participating in gymnastics and over 60 percent participating in hockey, soccer and baseball.

Of the top tenpin national and international performers, 50 percent started before the age of five. Further, they played other sports before the age of ten which allowed them to develop fundamental movement and sport skills before specializing in bowling.

It appears that many young bowlers did participate in a variety of sports before age ten, including baseball, gymnastics, basketball, hockey and track and field. Although bowling can be promoted as a great sport for children to try, one can become competent at any age or with any disability.



3 *A Holistic Approach to Athlete Development*

Coaches, teachers, proprietors and parents must always develop programs based on the athlete as a whole. A major objective of the LTAD process is to use a holistic approach for the development of the bowler. Considerations of the bowler's physical, mental, cognitive and emotional status must be factored into the development of the training, competition and recovery plan. A bowler's technical ability to score high may not necessarily mean that the athlete is able to handle the pressure of national or international competition. Adult expectations on youth bowlers may be pushing young athletes to compete in high pressure situations when they are not mentally ready.

For the youth bowler, this high pressure could mean school (exams) or peer pressure. For the 25 to 35 year old, this could mean family or career pressures. For the older bowler, consideration of the physical demands of aging must be factored into the overall program.

4 *Training to Maximize Potential, Performance and Enjoyment*

There are ten S's of training that need to be considered and integrated when developing an annual training, competition and recovery plan for an athlete. Typically, there are five physical capacities that are trained, including stamina (endurance), strength, speed, skill, and suppleness (or flexibility) (Dick, 1985). These physical capacities can be improved throughout an athlete's lifetime, but there are critical periods during which training produces the greatest benefit to each athlete's long-term development. In other words, athletes need to do the right type of training at the right time, based on when the athlete reaches puberty. If these physical capacities are not trained at the right time, the athlete may be good but will never reach his or her full potential. While the critical periods do follow general stages of human growth and maturation, scientific evidence shows that humans vary considerably in the magnitude and rate of response to different training stimuli at all stages.

★ **Stamina (Endurance)**

Peak Height Velocity (PHV) - is the maximum rate of growth in stature during growth spurt. The age of maximum velocity of growth is called the age at PHV.

Stamina is not necessarily a requirement to bowl, but stamina in a tournament is critical. A sensitive period of trainability for stamina occurs at the onset of PHV. Aerobic capacity training is recommended before athletes reach PHV and is determined by developmental age. Aerobic power should be introduced progressively after growth rate decelerates.

★ **Strength**

The sensitive period of trainability for strength is determined by developmental age and for girls is immediately after PHV or at the onset of menarche; for boys, it is 12 to 18 months after PHV. Speed strength and endurance strength can be developed before puberty using body weight, lighter loads, medicine balls and swiss balls.

Adults and youth can do some strength training at the bowling centre or outside of specific bowling practice. This will help improve core strength, balance and strength endurance to reduce inactivity, prevent injury and improve performance.

★ Speed

Speed is not important for bowling; however, it is important that this is trained in children and youth for overall development.

For boys, the first speed training window occurs between the ages of 7 and 9 years and the second window occurs between the ages of 13 and 16. For girls, the first speed training window occurs between the ages of 6 and 8 years and the second window occurs between the ages of 11 and 13 years.

★ Skill

The window for optimal skill training for boys takes place between the ages of 9 and 12 and between the ages of 8 and 11 for girls.

★ Suppleness (Flexibility)

The optimal window of trainability for suppleness for both genders occurs between the ages of 6 and 10. Special attention should be paid to flexibility during PHV. Bowlers have identified suppleness (flexibility) as one of the most important physical capacities to train.

Note: Activities to improve agility, balance, coordination and flexibility should be build into all programs and should be appropriate to the age and stage of the bowler.

Additional areas of focus

★ Sustenance

Includes nutrition, hydration, rest, sleep and regeneration – all of which need to be applied differently to training and lifestyle plans depending on the stage of the athlete. Improperly addressing sustenance can lead to weight gain or the inability to train and compete effectively.

★ Psychology

The bowler's ability to maintain high levels of concentration while remaining relaxed and confident is a skill that is needed for bowling and enhances everyday life. Mental training is critical at all stages since dealing with success and failure will impact the bowler's ability to focus and perform.

★ Schooling

Competition and training schedules need to account for school demands on players such as exams, academic loads and other school social activities. A good program will help balance the demands of school and sport, supporting the holistic approach of bowler development.

★ Stature/Structure

By tracking stature measurements and developmental age, a coach can address the five S's in the overall sport program.



★ **Socio-Cultural** – Sport provides an opportunity for athletes to broaden their understanding of their world by learning about different cultures, geography, cuisine and architecture when travelling to participate in tournaments. Bowlers should take advantage of this by touring beyond the hotel and the competition site.

5 *Early Maturers and Late Maturers*

Developmental age refers to the degree of physical, mental, cognitive, and emotional maturity in an individual.

Each child matures at a different rate and age, entering adolescence at different ages and taking different lengths of time to complete the process. This process starts at roughly the age of 10 or 11 for girls and about two years later for boys and usually takes 3 to 4 years to complete. However, there can be a variance of 2 to 4 years, depending on the individual. This difference in developmental age can create advantages and disadvantages for an individual athlete, creating challenges and opportunities for the sport system.

Late developers have a longer period of time to develop physical literacy and important fundamental motor and sport skills. Before puberty, a child has a developmental window that is perfectly designed for the acquisition and refinement of sport skills. However, often the sport system favors the early maturers because they are bigger, stronger, faster and more skilled. In many cases, the early maturing child is provided with more and better sport opportunities than their later maturing peers. Therefore, it is critical that coaches, administrators and programmers ensure that all children are given ample opportunity to practice and play with appropriate challenges given the athlete's developmental age.

Does bowling get athletes who have dropped out of other sports due to this issue? Do early maturing bowlers have advantages in training or in tournaments over their later maturing peers?

This has implications for appropriate training programs and competition participation. It may mean that bowlers of the same chronological age have different developmental needs. This may interfere with the social and fun aspect of the game.

Coaches, whether working with bowlers with or without a disability, must consider each individual athlete's physical, mental, cognitive and emotional maturity when developing programs and putting teams together to ensure an enjoyable and meaningful experience.



6

Periodization

Periodization is essentially a strategic plan to help an athlete achieve his or her performance objectives. The plan outlines and organizes training (volume, intensity, frequency), competition and recovery into a logical, well-monitored schedule. The plan is intended to help the athlete achieve the optimal performance at the right time. A properly periodized plan reflects the characteristics of an athlete including stage of development, trainability, sport age, training age, and performance gaps relating to the demands of the sport.

7

Competition Structure and Planning

“The system of competition makes or breaks an athlete” (Balyi et al, 2005)

The structure and frequency of competition is critical to athlete development. Using the LTAD stage-by-stage approach, the competition structure should emphasize the skill, tactical and physical competencies based on an athlete’s developmental needs as well as the requirements to bowl effectively.

At certain stages, skill development is more important than competing, scoring and formal competitions. **Scoring in practice can be counter-productive to the bowler’s skill development.**

As identified in the previous section on shortcomings, bowlers tend to over-compete and under-train. As a result, many of the fundamental sport skills are not learned effectively.



8

System Alignment

The LTAD concept is a framework for full sport system alignment, which means getting everyone in the sport system in agreement. Because there are many organizations, levels of government, and people involved in developing and delivering sport programs, LTAD recommends that parents, teachers, schools, coaches, clubs, recreation centres and governments coordinate their efforts. Even within BFC, Bowl Canada, CTF and C5PBA, there is a need to align all aspects of programming, including bowler development programs, competition structures, competition schedules and National Coaching Certification Program (NCCP).

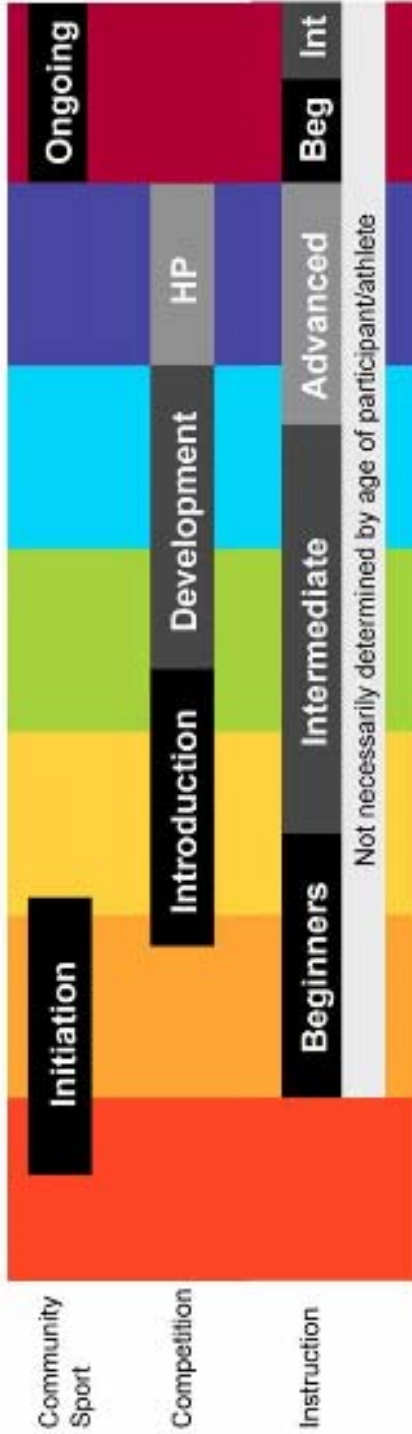
Do any of the current governance structures impede the progress and development of the bowler? Are coach education programs aligned in a way that the coach is prepared to meet the needs of the athlete based on the athlete’s LTAD stage? Does the system provide a coherent athlete development pathway with well aligned competition structures? Does bowler selection to an international team support the concepts outlined in the LTAD model?

Long-Term Athlete Development



Chronological Age → 1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13- 14- 15- 16- 17- 18- 19- 20- 21- 22- 23- 24- 25- 26- 27- 28- 29- 30- 31- 32- 33- 34- 35- 36+ → Active for Life

Training Age → 1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13- 14- 15- 16+ →



There's More to Coaching
L'entraînement, c'est plus qu'on l'enseigne

C. Flett, Director, NCCP



9

Ten Year Rule

Research in many sectors identify a ten year rule or 10,000 hours of focused practice or serious training to become an expert in sport, music or anything that requires significant expertise (Gladwell, 2008). Whether at the bowling centre or outside the bowling centre, effective programs can contribute to the “10,000 hours”. How many hours are appropriate at each of the LTAD stages? What skills should be practiced and mastered within these stages? It is recognized that there are costs associated with the development of world class bowlers. Therefore, the partners in the “bowler development process” should consider the challenges associated with the “10,000 hours”.

Imagine if you specialized early in bowling and had to cram those 10,000 hours into training before reaching adulthood. This should not be done and may lead to dropping out of the sport.

To be the best, both quality and quantity of training and competition must be planned. There are no shortcuts to be a national champion and a world-class competitor. All partners in the bowler’s performance must be prepared to support the type of training that is required.

10

Continuous Improvement

The concept of continuous improvement, which permeates LTAD, is drawn from the respected Japanese industrial philosophy known as Kaizen. LTAD responds and reacts to new scientific, sport-specific innovations and observations and is subject to continuous research in all aspects. It also recognizes that there are many ways to improve, such as using existing systems and structures, using partnerships, creative thinking, and collaboration with groups in the sport system.



We must be relentless in our pursuit of achieving a long-term approach to bowler development. This means that we cannot accept the status quo, even if that is the easier path. We need to aggressively service the membership in the “Bowl 4 life” stream, providing appropriate programs that can be used for various populations in the bowling centres.

For those in the competition stream, we must provide the best coaching in order to advance bowlers’ performances. This will include examining advances in training and in equipment development.

Our goal is to continuously improve in all aspects of our sport and embrace a “**Can do, must do**” philosophy.

LTAD Stages for Bowling

The BFC LTAD Committee has identified a stage approach for bowling. The progression is based on a bowler's ability to consistently perform certain skills and progress toward the identified "stage indicators".

This stage-by-stage approach encourages bowlers to focus on mastering identified skills and coaches to focus accordingly. Conditions that will affect a bowler's progression are as follows:

1 The degree of mastery of the fundamental motor skills that apply to bowling, such as balance, coordination, agility and hand-eye coordination.

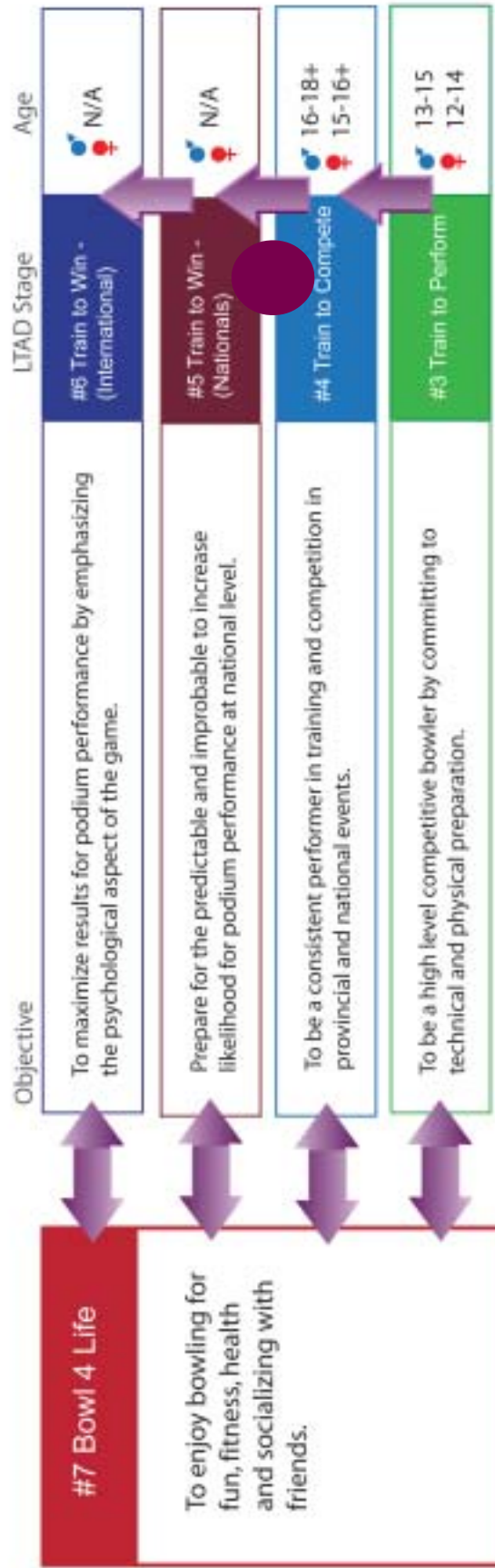
2 Participation in complimentary sports; an individual who has previously participated in sports that require agility, balance, and coordination may progress more quickly than others.

3 Coaching - A coach who develops effective practices and imparts good technical, tactical, physiological and psychological coaching can help the bowler improve significantly.

4 Equipment fit - A bowler must have appropriate equipment based on his or her size and level of ability. Equipment that is too big or heavy will limit the athlete's ability to perform the skill correctly.

5 Practice time - An individual who is able to practice in ideal conditions more often will progress more quickly.





Recreational Bowling Stream Competitive Bowling Stream





Learning and Development Continuum

The following matrix document outlines skills and abilities that are the focus of each LTAD stage. Bowling skills should be addressed as a sequential learning continuum that includes introducing, developing, refining, perfecting and maintaining skills. Each skill and ability has a specified stage that identifies a timeframe for its inclusion in the overall training program, based on a bowler's stage of development. The following pages provide a matrix of technical, tactical, physical and psychological skills and abilities. It is important that athletes and coaches review these skills while keeping in mind that an integrated training plan is the best way to ensure that these skills and abilities are carried over into practice and competitive situations.

Understanding the Terms

Introducing Bowlers correctly understand the fundamental movements needed to execute the skill or tactic. It is presumed that this skill or tactic will continue to be developed in later stages.

Developing It is through repeated practice of the correct performance of the skill to ensure basic execution becomes consistent. Application in a variety of appropriate settings with coach feedback will help a player develop the skill.

Refining A bowler is able to combine the skill with other skills and integrate into various aspects of the game. A bowler begins to place his or her own "style" into the skills and can link one skill with another in training and under pressure in a competitive situation.

Perfecting An athlete is becoming comfortable with his or her style and has adapted skills to his or her own physical, technical, tactical and psychological capabilities. Now a bowler can maintain correct technique under the pressure of a high-level competitive event.

Maintaining A bowler maintains existing technical, tactical and physical abilities by training and participating in Bowling for Life.

*Adapted from The Canadian Soccer Association,
Wellness to World Cup*

	FUNdamentals	Learn to Bowl	Train to Perform	Train to Compete	Train to Win National	Train to Win International	Bowl 4 Life
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
Program Objective	Fun Basic bowling skills	Fun Introducing bowling fitness	Building bowling fitness Advanced bowling skills	Building bowling fitness Optimize bowling skills	Performance at National Tournaments Maximize bowling fitness	Performance at International level	Fun Lifelong fitness and health through bowling
MOTOR/TECHNICAL							
Ball selection							
€ Drilling – 10 pin		Introduce	Develop	Refine	Perfect	Maintain	Develop/Refine
€ Weight/size	Introduce	Maintain	Maintain	Maintain	Maintain	Maintain	Develop/Refine
€ Material		Introduce	Develop	Refine	Perfect	Maintain	Develop/Refine
€ Selection	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
€ Fit	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
Release/Delivery							
€ Two handed release*	Introduce *	Reduce to eliminate Develop *					
€ One handed release	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
€ Hook ball		Introduce	Develop	Refine	Perfect	Maintain	Develop/Refine
€ Straight ball	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
€ Curve ball		Introduce	Develop	Refine	Perfect	Maintain	Develop/Refine
€ Backup ball		Introduce	Develop	Refine	Perfect	Maintain	Develop/Refine
€ Lift		Introduce	Develop	Refine	Perfect	Maintain	Develop/Refine
€ Turn (ten pin)		Introduce	Develop	Refine	Perfect	Maintain	Develop/Refine
€ Rotation (5 pin)		Introduce	Develop	Refine	Perfect	N/A	Develop/Refine
€ Lift & turn			Introduce	Develop	Refine	Perfect	Develop/Refine
€ Turn & lift			Introduce	Develop	Refine	Perfect	Develop/Refine
€ Hand & finger positions/grip		Introduce	Develop	Refine	Perfect	Maintain	Develop/Refine
€ Pendulum swing	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
€ Follow through	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine

	FUNdamentals	Learn to Bowl	Train to Perform	Train to Compete	Train to Win National	Train to Win International	Bowl 4 Life
Motor Technical							
Stance							
€ Starting position from foul line	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
€ Starting position with target systems	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
€ Balance	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
€ Ball placement	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
Approach							
€ Foul line position	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
€ 1-step approach	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
€ 3-step approach (5 pin)	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
€ 4-step approach	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine
€ 5-step approach (ten pin)		Introduce	Develop	Refine	Perfect	Maintain	Develop/Refine
€ Timing	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Develop/Refine

	FUNdamentals	Learn to Bowl	Train to Perform	Train to Compete	Train to Win National	Train to Win International	Bowl 4 Life
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
PHYSICAL PREPARATION							
€ Stamina	2 times/week	3 times per week	4 times per week	5-6 times per week	5-6 times per week	5-6 times per week	Daily
€ Strength		Introduce 2X/week	Develop 3X/week	Maintain 3X/week	Maintain 3X/week	Maintain 3X/week	2X/Week
€ Suppleness (flexibility)	Introduce 3-4 times/week	Develop 3-4 times/week	Maintain Daily	Maintain Daily	Maintain Daily	Maintain Daily	Daily
€ Agility/Balance/Coordination	Introduce	Develop	Refine	Refine	Perfect	Perfect	Maintain

	FUNdamentals	Learn to Bowl	Train to Perform	Train to Compete	Train to Win National	Train to Win International	Bowl 4 Life
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
RULES							
€ C5PBA rules	Introduce	Understand	Apply	Apply	Apply	N/A	Apply
€ CTF rules	Introduce	Understand	Apply	Apply	Apply	Apply	Apply
€ Tournament rules	Introduce	Understand	Apply	Apply	Apply	N/A	Apply
€ International				Introduce	Understand	Apply	Apply
ETIQUETTE							
€ Lane courtesy	Introduce	Apply	Apply	Apply	Apply	Apply	Apply
€ Sportsmanship	Introduce	Apply	Apply	Apply	Apply	Apply	Apply
SAFETY							
€ Ball	Introduce	Apply	Apply	Apply	Apply	Apply	Apply
€ Shoes	Introduce	Apply	Apply	Apply	Apply	Apply	Apply
€ Lane	Introduce	Apply	Apply	Apply	Apply	Apply	Apply
€ Attire	Introduce	Apply	Apply	Apply	Apply	Apply	Apply

	FUNdamentals	Learn to Bowl	Train to Perform	Train to Compete	Train to Win National	Train to Win International	Bowl 4 Life
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
Program Objective	Fun Basic bowling skills	Fun Introducing bowling fitness	Building bowling fitness Advanced bowling skills	Building bowling fitness Optimize bowling skills	Performance at Tournaments Maximize bowling fitness		Fun Lifelong fitness and health through bowling
TACTICAL							
€ Lane & approach awareness	Introduce	Develop	Refine	Perfect	Maintain	Maintain	Practice
€ Striking	Introduce	Develop	Refine	Perfect	Optimize	Optimize	Practice
€ Targeting	Introduce	Develop	Refine	Perfect	Optimize	Optimize	Practice
€ Spare Shooting	Introduce	Develop	Refine	Perfect	Optimize	Optimize	Practice

€ Carrying adjustments		Introduce	Develop	Perfect	Optimize	Optimize	Practice
€ Lane Conditions			Introduce	Refine	Optimize	Optimize	Practice

	FUNdamentals	Learn to Bowl	Train to Perform	Train to Compete	Train to Win National	Train to Win International	Bowl 4 Life
PSYCHOLOGICAL PREPARATION							
€ Goal setting	Introduce	Develop	Refine	Perfect	Optimize	Optimize	Practice
€ Peak performance			Introduce	Refine	Perfect	Optimize	Practice
€ Imagery		Introduce	Develop	Refine	Perfect	Optimize	Practice
€ Focus/Re-focus	Introduce	Develop	Refine	Refine	Perfect	Optimize	Practice
€ Stress management			Introduce	Refine	Perfect	Optimize	Practice
€ Distraction control			Introduce	Refine	Perfect	Optimize	Practice
€ Relaxation/stimulus		Introduce	Develop	Refine	Perfect	Optimize	Practice

COMPETITION	FUNdamentals	Learn to Bowl	Train to Perform	Train to Compete	Train to Win National	Train to Win International	Bowl 4 Life
Training: Competition Ratio							
League Play: Tournament Ratio							
Types of Tournaments							

ACTIVE START

MALES & FEMALES AGE 0 TO 6

The overall focus in the active start stage is to promote the love of physical fitness through involvement in a variety of activities. The primary objective is to learn fundamental movements and link these movements together in a play environment. Daily active play, both structured in lessons and games as well as unstructured play at home, school, daycare centres and so on, is a way for children to be physically active.

- ★ 30 minutes per day of structured play (minimum) for toddlers.
- ★ 60 minutes per day of structured play (minimum) for pre-schoolers.
- ★ 60 minutes to several hours per day of unstructured play.

Fundamental Movement Skills:

Participate in a variety of activities that include:



**agility
balance
coordination
walking
running
jumping
throwing
catching
rolling
wheeling**

Although this is not part of the BFC's LTAD model, it is critical for youngsters to begin an active lifestyle. Young children may be introduced to bowling for fun as part of birthday parties or family outings. However, participation in a structured bowling program is not recommended until Stage 1: Fundamentals.

STAGE 1

Fundamentals

Introducing the fundamental movement skills in bowling and other physical activities



For the child or youth bowler, the overall aim continues to be FUN and Fitness while mastering many fundamental movement skills that are critical to success in sport. The child or youth bowler is still at a prime age for acquiring movement skills and, therefore, should be participating in a variety of sport activities.

An adult beginning bowler may be participating three or four times per week in other physical activities but wishes to try bowling once or twice a week. Individuals participating in their first year of bowling will learn the basic bowling skills that are required to enjoy and play the game.

A **bowler with a physical or intellectual disability** may require more time to learn some of the technical skills and may require more opportunities to practice the identified skills. Considering that the BMI for bowlers with a disability averaged in the “overweight” category, it is important to add fitness elements to do on the lanes or outside of bowling practice.



Components to Focus On

TECHNICAL	TACTICAL	PHYSICAL	PSYCHOLOGICAL
<p>INTRODUCE</p> <p>BALL SELECTION</p> <ul style="list-style-type: none"> • Weight/size, selection and fit <p>RELEASE/DELIVERY</p> <ul style="list-style-type: none"> • Two handed release • One handed release • Straight ball • Pendulum swing • Follow through <p>STANCE</p> <ul style="list-style-type: none"> • Starting position from foul line • Starting position with target systems • Balance • Ball placement <p>APPROACH</p> <ul style="list-style-type: none"> • Foul line position • 1-step approach • 3-step approach • 4-step approach • Timing 	<p>INTRODUCE</p> <ul style="list-style-type: none"> • Lane & approach awareness • Striking • Targeting • Spare shooting 	<p>STAMINA</p> <ul style="list-style-type: none"> • 2 times/week <p>SUPPLENESS</p> <ul style="list-style-type: none"> • 3-4 times/week <p>AGILITY, BALANCE/ COORDINATION</p> <ul style="list-style-type: none"> • Introduce 	<p>INTRODUCE</p> <ul style="list-style-type: none"> • Goal setting • Focus / re-focus
RULES	ETIQUETTE	SAFETY	COMPETITION
<p>INTRODUCE</p> <ul style="list-style-type: none"> • C5PBA rules • CTF rules • Tournament rules 	<p>INTRODUCE</p> <ul style="list-style-type: none"> • Lane courtesy • Sportsmanship 	<p>INTRODUCE</p> <ul style="list-style-type: none"> • Ball, shoes, lane, attire 	

Coaches should:

- Ensure that the ball is correctly fitted for the bowler
- Participate in the 5 or tenpin community initiation coach education as part of the National Coaching Certification Program
- Introduce drills and teaching methods if bowler is having difficulty performing a skill

Parents/support network should:

- Respect the role of the coach in your child's development and progress in bowling
- Support your child's participation in a bowling program by respecting the parameters of the program

Bowlers should:

- Have fun and enjoy the game
- Seek additional help from a qualified coach through the bowling centre

Bowling centre staff should:

- Assist with the selection of equipment to ensure the correct fit
- Service customers with appropriate programs and instruction to increase participation
- Be committed to the overall promotion of bowling for the future by being professional, businesslike and supportive of the bowlers and coaches
- Provide healthy choices at snack bar such as fruit, vegetables, or low fat yogurt
- Ensure that all lanes meet certification and sanctioning specifications

Indicators that the bowler is ready to move to Learn to Bowl stage:

- Hit head pin 30%
- Ball remains on the lane 30%
- Complete 3 games
- Make 5-10% of spares

National Sport Organization (NSO)/Provincial Sport Organization (PSO)/ Territorial Sport Organization (TSO) initiatives:

- Work with bowling centre proprietors to promote the use of certified and qualified coaches

KEY RECOMMENDATIONS:

A balanced approach is most important at this stage where the beginning bowler is encouraged to participate in many activities to develop fundamental movement and motor skills that will contribute to overall physical literacy.

Ensure that knowledgeable technical instruction is available to all new bowlers for safety, enjoyment, fitness and success.

STAGE 2

Learn To Bowl

Use fundamental movement and sport skills to enjoy participating and competing

The **Learn to Bowl** bowler could be a child, youth or adult, depending on when the individual starts bowling. In this stage, the primary objective is to develop the basic skills learned in the **previous** stage and to learn more complex technical skills and tactics as the bowler becomes more proficient. Bowlers will be introduced to psychological preparation required to train and compete at local leagues. Adult bowlers may also participate in tournaments. Bowlers at this stage may own their own equipment and will become more skilled at selecting the right equipment for comfort and to assist in improving their game.

Youth bowlers who have not reached puberty are still in a prime window for acquiring sport skills. Therefore, these bowlers should still be participating in a variety of sports and not specializing too early in bowling.



Adult bowlers should participate in league play and additional off-lane physical activity including aerobic, strength and flexibility training or other sports.

At the end of this stage, bowlers will make a decision regarding which stream they will pursue: the competitive stream or **Bowling for Life**.

Components to Focus On

TECHNICAL	TACTICAL	PHYSICAL	PSYCHOLOGICAL
<p>-- BALL SELECTION Introduce</p> <ul style="list-style-type: none"> • Material • Drilling (tenpin) <p>Maintain</p> <ul style="list-style-type: none"> • Weight/size <p>Develop</p> <ul style="list-style-type: none"> • Selection and fit <p>-- RELEASE/DELIVERY Introduce</p> <ul style="list-style-type: none"> • Hook ball • Curve ball (tenpin) • Back up ball • Lift • Turn • Rotation (5 pin) • Hand/finger position (grip) <p>Develop</p> <ul style="list-style-type: none"> • One handed release • Straight ball • Pendulum swing • Follow through <p>Reduce to Eliminate</p> <ul style="list-style-type: none"> • Two handed delivery <p>-- STANCE Develop</p> <ul style="list-style-type: none"> • Starting position from foul line • Starting position with target systems • Balance • Ball placement <p>-- APPROACH Introduce</p> <ul style="list-style-type: none"> • 5 step approach (tenpin) <p>Develop</p> <ul style="list-style-type: none"> • Foul line position • 1-step approach • 3-step approach (5 pin) • 4-step approach • Timing 	<p>Introduce</p> <ul style="list-style-type: none"> • Carrying adjustments <p>Develop</p> <ul style="list-style-type: none"> • Lane & approach awareness • Striking • Targeting • Spare shooting 	<p>Stamina</p> <ul style="list-style-type: none"> • 3 times/week <p>Strength</p> <ul style="list-style-type: none"> • 2 times/week <p>Suppleness</p> <ul style="list-style-type: none"> • 3-4 times/week <p>Agility, balance / coordination</p> <ul style="list-style-type: none"> • Develop 	<p>Introduce</p> <ul style="list-style-type: none"> • Imagery • Relaxation/stimulus <p>Develop</p> <ul style="list-style-type: none"> • Goal Setting • Focus/re-focus
RULES	ETIQUETTE	SAFETY	COMPETITION
<p>Understand</p> <ul style="list-style-type: none"> • C5PBA rules • CTF rules • Tournament rules 	<p>Apply</p> <ul style="list-style-type: none"> • Lane courtesy • Sportsmanship 	<p>Apply</p> <ul style="list-style-type: none"> • Ball, shoes, lane, attire 	

Coaches should:

- Participate in the 5 pin or tenpin community initiation coach education as part of the NCCP.
- Continue to use drills to develop skills to enhance consistency and proficiency to improve scores on performance indicators.
- Introduce strength, flexibility and stamina training that can be done at the bowling centre.
- Advise bowlers about the purchase of personal equipment (ball, shoes).
- Encourage bowlers to practice three games (for skill development) without scoring as well as three games in league play (six games per week).
- Encourage cross training and participation in other physical or sport activity.
- Focus on development process and not on the bowler's score.

Parents/support network should:

- Respect the role of the coach in your child's development and progress in bowling.
- Seek out programs with qualified coaches.
- Support your child's participation in a bowling program by respecting the parameters of that program.
- Maintain a long-term perspective about your child's development in bowling.
- Focus on development process and not on the bowler's score.

Bowlers should:

- Commit to improving technical skills.
- Practice imagery in practice and in league play.
- Practice three games (for skill development) without scoring as well as three games in league play (six games per week).
- Participate in cross training activities for the development of strength, stamina and flexibility on a year round basis.
- Focus on development process and not on the bowler's score.

Practice:

Bowling specific: Skill training and practice should be at a ratio of one on lane practice to one league series.

Other sport or physical activities: 4 to 6 times per week for 30 to 60 minutes per session.

Bowling centre staff should:

- Assist with the selection of equipment to ensure the correct fit.
- Service customers with appropriate programs and instruction to increase participation.
- Be committed to the overall promotion of bowling for the future by being professional, businesslike and supportive of the bowlers and coaches.
- Provide healthy choices at snack bar such as fruit, vegetables or low fat yogurt.
- Ensure that all lanes meet certification and sanctioning specifications.

Indicators that the bowler is ready to move to Train to Perform stage:

- Hit head pin 40%
- Ball remains on the lane 60%
- Complete 6 games
- Make 15-20% of spares
- Strike - 10%

NSO/PSO/TSO initiatives:

- Promote Goal to Bowl program for school bowling.
- Identify, set and enforce minimum coaching standards or requirements for active league coaches and coaches at tournaments.
- Work with bowling centre proprietors to promote the use of certified and qualified coaches.

KEY RECOMMENDATIONS:

Ensure that the athlete goals and performance expectations are realistic and consistent with their actual development. Competition participation should be aligned appropriately to a bowlers' performance level.



STAGE 3

Train To Perform

Aspires to be a high-level competitive bowler by committing to the necessary technical and physical preparation

The **Train to Perform** bowler has decided to pursue excellence and participate in the type of training required to eventually be competitive at the provincial, national, international or professional level. The bowler at this stage is committed and motivated to participate in league and local level tournaments. The bowler trains both on and off the lanes to be physically and mentally ready to play in order to perfect his or her game. A bowler at this stage receives more in-depth technical instruction from a qualified coach.

The bowler is now more consistent in the execution of the identified bowling skills. Training and practice continue to be important in the bowler's development. While competing and scoring are also part of this development, the primary objective is to demonstrate consistent execution of the necessary technical, tactical, psychological and physical elements of the sport.



Again, for both 5 Pin and tenpin bowlers at this stage, love of the game is the main priority.

Components to Focus On

TECHNICAL	TACTICAL	PHYSICAL	PSYCHOLOGICAL
<p>-- BALL SELECTION DEVELOP</p> <ul style="list-style-type: none"> • Material • Drilling (tenpin) <p>REFINE</p> <ul style="list-style-type: none"> • Selection and fit <p>MAINTAIN</p> <ul style="list-style-type: none"> • Weight/size <p>-- RELEASE/DELIVERY INTRODUCE</p> <ul style="list-style-type: none"> • Lift & Turn • Turn & Lift <p>DEVELOP</p> <ul style="list-style-type: none"> • Hook ball • Curve ball (tenpin) • Back up ball • Lift • Turn • Rotation (5 pin) • Hand/finger position (grip) <p>REFINE</p> <ul style="list-style-type: none"> • One handed release • Straight ball • Pendulum swing • Follow through <p>-- STANCE REFINE</p> <ul style="list-style-type: none"> • Starting position from foul line • Starting position with target systems • Balance • Ball placement <p>-- APPROACH DEVELOP</p> <ul style="list-style-type: none"> • 5 step approach (tenpin) <p>REFINE</p> <ul style="list-style-type: none"> • Foul line position • 1-step approach • 3-step approach (5 pin) • 4-step approach • Timing 	<p>INTRODUCE</p> <ul style="list-style-type: none"> • Lane conditions <p>DEVELOP</p> <ul style="list-style-type: none"> • Carrying adjustments <p>REFINE</p> <ul style="list-style-type: none"> • Lane & approach awareness • Striking • Targeting • Spare shooting 	<p>STAMINA</p> <ul style="list-style-type: none"> • 4 times/week <p>STRENGTH</p> <ul style="list-style-type: none"> • 3 times/week <p>SUPPLENESS</p> <ul style="list-style-type: none"> • Daily <p>AGILITY, BALANCE / COORDINATION</p> <ul style="list-style-type: none"> • Refine 	<p>INTRODUCE</p> <ul style="list-style-type: none"> • Peak performance • Stress management • Distraction control <p>DEVELOP</p> <ul style="list-style-type: none"> • Imagery • Relaxation/stimulus <p>REFINE</p> <ul style="list-style-type: none"> • Goal Setting • Focus/re-focus
RULES	ETIQUETTE	SAFETY	COMPETITION
<p>APPLY</p> <ul style="list-style-type: none"> • C5PBA rules • CTF rules • Tournament rules 	<p>APPLY</p> <ul style="list-style-type: none"> • Lane courtesy • Sportsmanship 	<p>APPLY</p> <ul style="list-style-type: none"> • Ball, shoes, lane, attire 	

Coaches should:

- Participate in the 5 Pin or tenpin competition introduction coach education as part of the NCCP.
- Continue to use drills to develop and refine skills to enhance consistency and proficiency to improve scores on performance indicators.
- Introduce advanced skills and drills identified on the bowling matrix.
- Develop, maintain and refine strength, flexibility and stamina training routines that can be done at the bowling centre and outside of bowling practice.
- Advise bowler about the purchase of additional personal equipment (ball, shoes etc.).
- Encourage bowlers to practice independently 3-5 games (for skill development) without scoring as well as three games in league play (6-8 games per week).
- Encourage cross training and participation in other physical or sport activity.
- Continue to focus on development process and not on the bowler's score.

Parents/support network should:

- Respect the role of the coach in your child's development and progress in bowling.
- Seek out programs with qualified coaches.
- Support your child's participation in a bowling program by respecting the parameters of that program.
- Maintain a long-term perspective about your child's development in bowling.
- Focus on the development process and not on the score.

Bowlers should:

- Commit to improving technical skills.
- Practice imagery in practice and in league play.
- Practice 3-5 games independently (for skill development) without scoring as well as three games in league play (6-8 games per week).
- Participate in cross training activities for the development of strength, stamina and flexibility on a year round basis.
- Focus on development process and not on the bowler's score.
- Ensure that health and wellness are part of the overall program (nutrition, sleep, etc).

Practice:

Bowling specific: Skill training and practice should be at a ratio of two on lane practice to one league series.

Other sport or physical activities: 4-6 times per week for 45-60 minutes per session.

Bowling centre staff should:

- Service customers with appropriate programs and instruction to retain participation and improve bowler's proficiency
- Be committed to the overall promotion of bowling for the future by being professional, businesslike and supportive of the bowlers and coaches.
- Provide healthy choices at snack bar such as fruit, vegetables or low fat yogurt etc.
- Work with NSO/PSO/TSO to offer educational seminars.
- Ensure that all lanes meet certification and sanctioning specification.

Indicators that the bowler is ready to move to Train to Compete stage:

- Hit head pin 50%
- Ball remains on the lane 90%
- Complete 6-8 games
- Make 50% of spares
- Strike - 20-30%

Note: Bowlers with a Disability may fit into the more advanced LTAD stages but may not be able to achieve the “stage indicators”. This will vary depending on the athlete, the type of coaching received, the disability, the competition structure and the parameters identified for selection and performance.

NSO/PSO/TSO initiatives

- Identify, set and enforce minimum coaching standards or requirements for active league coaches.
- Provide opportunities for local and regional tournaments.
- Offer and promote coach education seminars.
- Provide athlete skill development clinics.
- Work with bowling centre proprietors to promote the use of certified and qualified coaches.

KEY RECOMMENDATIONS:

Bowlers have now made a choice to become competitive bowlers pursuing the “excellence path”. All programs and support must reflect this. Therefore, serious training and competition opportunities must support the athletes in their endeavors.

STAGE 4

TRAIN TO COMPETE

A consistent performer in training and competition in provincial and national events

Training to Compete bowlers are consistently placing in the top three at Provincial Championships. These bowlers are meticulous in their preparation and follow a single periodized program with the Provincial Championships being the pinnacle tournament for the year.

These athletes participate in training on a year round basis that is specifically planned for top performances in the identified competitions. As these bowlers progress through this stage, they become more consistent and are able to handle the pressure of a high-level tournament. Both the coaches and athletes should consult with the Integrated Support Team (IST) to ensure knowledgeable physiologists, nutritionists and sport psychologists are advising on the overall program planning and monitoring.

These bowlers are able to train and compete under a variety of conditions, becoming more consistent over time. Programs at this point begin to be individualized based on performance analysis and identified gaps. All bowlers are now past “PHV” and physical training is based on annual fitness testing and monitoring. Bowlers demonstrate highly technical skills consistently and tournament results reflect this by placing in the top three at a provincial level.

Bowlers at this stage receive advanced technical instruction from qualified coaches.

At this point, a talent identification system should be developed and implemented to track and ensure potential world-class bowlers are being supported with a sound, well-rounded training program.



Components to Focus On

TECHNICAL	TACTICAL	PHYSICAL	PSYCHOLOGICAL
<p>-- BALL SELECTION REFINE <ul style="list-style-type: none"> • Material • Drilling (tenpin) PERFECT <ul style="list-style-type: none"> • Selection and fit MAINTAIN <ul style="list-style-type: none"> • Weight/size -- RELEASE/DELIVERY DEVELOP <ul style="list-style-type: none"> • Lift & Turn • Turn & Lift REFINE <ul style="list-style-type: none"> • Hook ball • Curve ball (tenpin) • Back up ball • Lift • Turn • Rotation (5 pin) • Hand/finger position (grip) PERFECT <ul style="list-style-type: none"> • One handed release • Straight ball • Pendulum swing • Follow through -- STANCE PERFECT <ul style="list-style-type: none"> • Starting position from foul line • Starting position with target systems • Balance • Ball placement -- APPROACH REFINE <ul style="list-style-type: none"> • 5-step approach (tenpin) PERFECT <ul style="list-style-type: none"> • Foul line position • 1-step approach • 3-step approach (5 pin) • 4-step approach • Timing </p>	<p>REFINE <ul style="list-style-type: none"> • Lane Conditions PERFECT <ul style="list-style-type: none"> • Carrying adjustments • Lane & approach awareness • Striking • Targeting • Spare shooting </p>	<p>STAMINA <ul style="list-style-type: none"> • 5-6 times/week STRENGTH <ul style="list-style-type: none"> • 3 times/week SUPPLENESS <ul style="list-style-type: none"> • Daily AGILITY, BALANCE / COORDINATION <ul style="list-style-type: none"> • Refine </p>	<p>REFINE <ul style="list-style-type: none"> • Peak performance • Stress management • Distraction control • Imagery • Relaxation/stimulus • Focus/re-focus REFINE <ul style="list-style-type: none"> • Goal setting </p>
RULES	ETIQUETTE	SAFETY	COMPETITION
<p>APPLY <ul style="list-style-type: none"> • C5PBA rules & CTF rules • Tournament rules INTRODUCE <ul style="list-style-type: none"> • International (tenpin) </p>	<p>APPLY <ul style="list-style-type: none"> • Lane courtesy • Sportsmanship </p>	<p>APPLY <ul style="list-style-type: none"> • Ball, shoes, lane, attire </p>	

Coaches must:

- Be trained in the tenpin competition development coach education as part of the NCCP.
- Be certified in the 5 pin competition introduction coach education as part of the NCCP.
- Refine and perfect drills and skills to enhance consistency and proficiency to improve scores on performance indicators.
- Develop and refine advanced skills and drills identified on the bowling matrix.
- Maintain and refine strength, flexibility and stamina training routines that can be done at the bowling centre and outside of bowling practice.
- Continue to analyze personal equipment as products develop and as athletes becomes more technically proficient and competitive.
- Encourage bowlers to practice independently 10-12 games (for skill development) without scoring as well as three games in league play (10-15 games per week).
- Use cross training and participation in other physical or sport activity to augment the bowling-specific training program.
- Continue to focus on development process as well as bowler's score.
- Prepare a sound periodized program that identifies key competitions in addition to league play.

Parents/support network should:

- Ensure that the program provides qualified coaching.
- Respect the role of the coach in your child's development and progress in bowling.
- Encourage the athlete to have interests outside of bowling to maintain a balanced lifestyle.
- Discuss and listen to the bowler to ensure he or she is still enjoying bowling.
- Support your athlete's participation in a bowling program by respecting the parameters and the bowler's long-term development.
- Always maintain composure demonstrating neutral body language while bowler is competing.

Bowlers should:

- Practice independently 10-12 games (for skill development) without scoring as well as three games in league play (10-15 games per week).
- Enjoy activities outside of bowling.

Practice:

Bowling specific: Skill training and practice should be at a ratio of four on lane practice to one league series.

Other sport or physical activities: 3-5 times per week at 45-90 minutes per session.



The volume, frequency and intensity of all training and competition will fluctuate depending on training priorities within the overall program. During the regeneration phase of training other physical activities and participation in other sport activities will increase to provide a mental break for the bowler.

Bowling centre staff should:

- Service customers with appropriate programs and opportunities to retain participation and improve bowler's proficiency.
- Offer financial incentives for those athletes needing a high volume of practice time.
- Ensure healthy choices at snack bar.
- Work with NSO/PSO/TSO to offer educational seminars.
- Ensure that all lanes meet certification and sanctioning specifications.

NSO/PSO/TSO initiatives:

- Enforce minimum coaching standards or requirements for active league and tournament coaches.
- Provide opportunities for local, regional and provincial tournaments.
- Continue to offer and promote professional development for coaches.
- Provide athlete skill development clinics.
- Cooperate to develop a system of talent identification and evaluation.
- Work with bowling centre proprietors to promote the use of certified and qualified coaches.

Indicators that the bowler is ready to move to Train to Win stage:

- Hit head pin 70%
- Ball remains on the lane 90%
- Complete 10-15 games/week
- Make 60-70% of spares
- Strike: 30-40%

Note:

Bowlers with a Disability may fit into the more advanced LTAD stages but may not be able to achieve the “stage indicators”. This will vary depending on the athlete, the type of coaching received, the disability, the competition structure and the parameters identified for selection and performance.



KEY RECOMMENDATIONS:

Bowlers have now made a choice to become competitive bowlers, pursuing a path of high performance. All programs and support must be reflective of this. Therefore, serious training and competition opportunities must support the athletes in their endeavor to pursue excellence.

A system of talent identification needs to be developed and implemented. This does not mean talented athletes are fast tracked to participate in tournaments that are beyond their developmental stage; it means that appropriate opportunities for development and training are provided to maximize their potential.

STAGE 5

TRAIN TO WIN (NATIONALS)

Prepare for the predictable and improbable to increase probability for podium performance at national level

Training to Win bowlers are consistently placing in the top three at National Championships. These athletes prepare meticulously and follow a single periodized program with the National Championships being the pinnacle tournament for the year. These bowlers participate in physical training on a year round basis that is specifically planned for top performances in the identified competitions. As these bowler progress through this stage, they become more consistent and are able to handle the pressure of high-level tournaments. These athletes receive advanced technical instruction from qualified coaches.

Athletes at this stage are able to train and compete under a variety of conditions, becoming more consistent over time. Programs at this point are to be individualized based on performance analysis and identified gaps. Physical training is based on annual fitness testing and monitoring.

The majority of the bowlers' technical, tactical, physical and psychological skills and abilities are now fully established. The focus of preparation is on consistent and optimum performance under intense competition situations.

The 5 pin athletes have trained to be at their peak at national tournaments. All aspects of preparation come together for their best performance. For tenpin bowling, athletes may be showing talent indicative of world-class bowlers and some may be identified in the talent pool for the national team for upcoming years.



Components to Focus On

TECHNICAL	TACTICAL	PHYSICAL	PSYCHOLOGICAL
<p>-- BALL SELECTION PERFECT</p> <ul style="list-style-type: none"> • Material • Drilling (tenpin) <p>MAINTAIN</p> <ul style="list-style-type: none"> • Selection and fit • Weight/size <p>-- RELEASE/DELIVERY REFINE</p> <ul style="list-style-type: none"> • Lift & Turn • Turn & Lift <p>PERFECT</p> <ul style="list-style-type: none"> • Hook ball • Curve ball (tenpin) • Back up ball • Lift • Turn • Rotation (5 pin) • Hand/finger position (grip) <p>MAINTAIN</p> <ul style="list-style-type: none"> • One handed release • Straight ball • Pendulum swing • Follow through <p>-- STANCE MAINTAIN</p> <ul style="list-style-type: none"> • Starting position from foul line • Starting position with target systems • Balance • Ball placement <p>-- APPROACH PERFECT</p> <ul style="list-style-type: none"> • 5-step approach (tenpin) <p>MAINTAIN</p> <ul style="list-style-type: none"> • Foul line position • 1-step approach • 3-step approach (5 pin) • 4-step approach • Timing 	<p>OPTIMIZE</p> <ul style="list-style-type: none"> • Lane conditions • Carrying adjustments • Striking • Targeting • Spare shooting <p>MAINTAIN</p> <ul style="list-style-type: none"> • Lane & approach awareness 	<p>STAMINA</p> <ul style="list-style-type: none"> • 5-6 times/week <p>STRENGTH</p> <ul style="list-style-type: none"> • 3 times/week <p>SUPPLENESS</p> <ul style="list-style-type: none"> • Daily <p>AGILITY, BALANCE/ COORDINATION</p> <ul style="list-style-type: none"> • Perfect 	<p>PERFECT</p> <ul style="list-style-type: none"> • Peak performance • Stress management • Distraction control • Imagery • Relaxation/stimulus • Focus/re-focus <p>OPTIMIZE</p> <ul style="list-style-type: none"> • Goal setting
RULES	ETIQUETTE	SAFETY	COMPETITION
<p>APPLY</p> <ul style="list-style-type: none"> • C5PBA rules • CTF rules • Tournament rules <p>UNDERSTAND</p> <ul style="list-style-type: none"> • International (tenpin) 	<p>APPLY</p> <ul style="list-style-type: none"> • Lane courtesy • Sportsmanship 	<p>APPLY</p> <ul style="list-style-type: none"> • Ball, shoes, lane, attire 	

Coaches must:

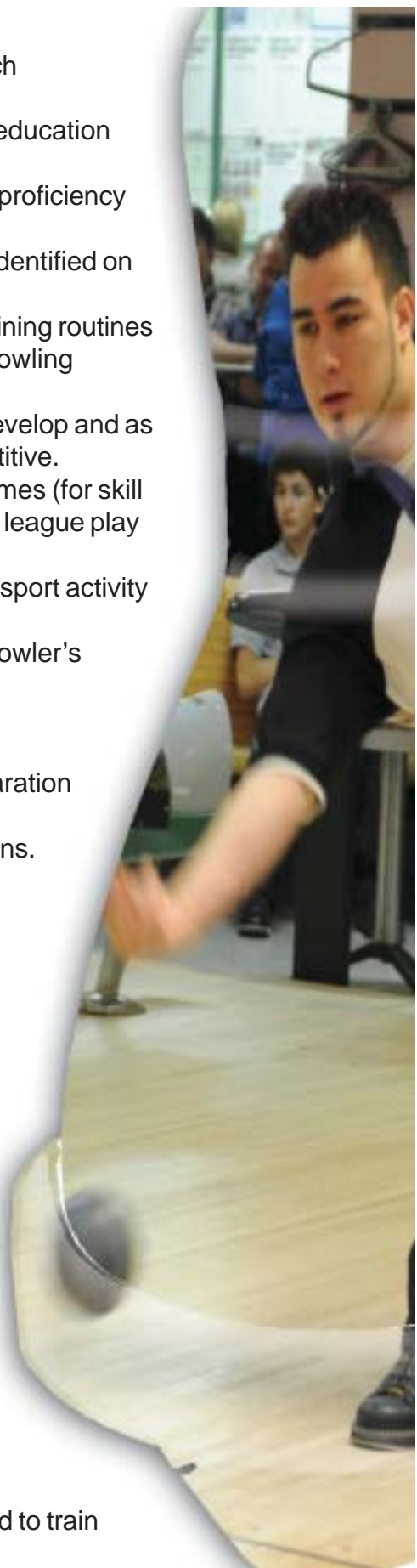
- Be certified in the tenpin competition development coach education as part of the NCCP.
- Be certified in the 5 pin competition introduction coach education as part of the NCCP.
- Perfect and maintain skills to enhance consistency and proficiency to improve scores on performance indicators.
- Refine, perfect and maintain advanced skills and drills identified on the bowling matrix.
- Perfect and maintain strength, flexibility and stamina training routines that can be done at the bowling centre and outside of bowling practice.
- Continue to analyze personal equipment as products develop and as athletes become more technically proficient and competitive.
- Encourage bowlers to practice independently 20-40 games (for skill development) without scoring as well as three games in league play (20- 40 games per week).
- Use cross training and participation in other physical or sport activity to augment the bowling-specific training program.
- Continue to focus on development process as well as bowler's score.
- Prepare a sound periodized program that identifies key competitions in addition to league play.
- Promote and support all aspects of psychological preparation for advanced performance in training and competition.
- Be available to respond to athletes' and parents' concerns.

Parents/support network should:

- Ensure that the program in which the athlete is participating provides qualified coaching.
- Respect the role of the coach in athlete's development and progress in bowling.
- Encourage the athlete to have interests outside of bowling to maintain a balanced lifestyle.
- Discuss and listen to the bowler to ensure he or she is still enjoying bowling.
- Support the athlete's participation in a bowling program by respecting the parameters and the bowler's long-term development.
- Always maintain composure demonstrating neutral body language while the bowler is competing.

Bowlers should:

- Be a role model to aspiring young bowlers.
- Promote bowling as a sport.
- Be diligent about being physically and mentally prepared to train and compete.



- Be aware of how outside activities such as sleep, nutrition and other life stresses can impact training and competition.
- Work with coaches to consult other experts in the area of sport preparation such as psychologists and nutritionists.
- Seek out training and competition conditions that will simulate conditions for a National Tournament.
- Prepare and conduct themselves as representatives of their clubs and provinces. All preparation and actions should be indicative of behaviors consistent with those of champions.

Practice:

The volume, frequency and intensity of all training and competition will fluctuate depending on training priorities within the overall program. During the regeneration phase of training, other physical activities and participation in other sports should increase to provide mental breaks for the bowlers.

Bowling centre staff should:

- Be committed to overall promotion of bowling by being professional, businesslike and supportive of bowlers and coaches.
- Provide healthy choices at snack bar such as fruit and vegetable team trays.
- Provide a safe and clean environment.
- Ensure that all lanes meet certification and sanctioning specifications.

NSO/PSO/TSO initiatives

- Identify and enforce minimum coaching standards for a National Championship.
- Work with bowling centre proprietors to promote the use of certified and qualified coaches.
- Offer and promote coach education seminars.
- Enforce standards and specification requirements for National Competitions.

Indicators that the bowler is ready to move to Train to Win (International) stage:

- Hit head pin 90-95%
- Ball remains on the lane 100%
- Complete 20-40 games/week
- Make 90% of spares
- Strike: 50%

Note: Bowlers with a Disability may fit into the more advanced LTAD stages but may not be able to achieve the “stage indicators”. This will vary depending on the athlete, the type of coaching received, the disability, the competition structure and the parameters identified for selection and performance.

KEY RECOMMENDATIONS:

The Train to Win bowler (Nationals) must be following an annual training, competition and recovery plan that is focused on podium performances.

Non-scoring practice sessions must outweigh scoring and competing based on the priorities identified in the annual plan.



International tenpin bowlers prepare to maximize all skills and capacities for podium performances at the world championships or the Pan American Games. These athletes are committed to producing consistent performances on demand. They can make the shot, hit the pin, and adapt to lane oil patterns and other challenging conditions.

Preparation must include mental and psychological training for high stress and intense tournament environments, recognizing that a multi-sport games such as the Pan American Games is markedly more mentally taxing than single sport competitions. Bowlers at this level must practice these routines for mental preparation well in advance of the priority tournament to ensure they can produce the ideal performance state on demand.

These bowlers and all support personnel must be engaged in creating a training, competition and recovery program that addresses the performance gaps of the athletes. An integrated support team should be identified to ensure that a high level of expertise is used to optimize all aspects of preparation.

Components to Focus On

TECHNICAL	TACTICAL	PHYSICAL	PSYCHOLOGICAL
<p>-- BALL SELECTION MAINTAIN</p> <ul style="list-style-type: none"> • Material • Drilling (tenpin) • Selection and fit • Weight/size <p>-- RELEASE/DELIVERY PERFECT</p> <ul style="list-style-type: none"> • Lift & Turn • Turn & Lift <p>MAINTAIN</p> <ul style="list-style-type: none"> • Hook ball • Curve ball (tenpin) • Back up ball • Lift • Turn • One handed release • Straight ball • Pendulum swing • Follow through • Hand/finger position (grip) <p>-- STANCE MAINTAIN</p> <ul style="list-style-type: none"> • Starting position from foul line • Starting position with target systems • Balance • Ball placement <p>-- APPROACH MAINTAIN</p> <ul style="list-style-type: none"> • 5-step approach • Foul line position • 1-step approach • 4-step approach • Timing 	<p>OPTIMIZE</p> <ul style="list-style-type: none"> • Lane conditions • Carrying adjustments • Striking • Targeting • Spare shooting <p>MAINTAIN</p> <ul style="list-style-type: none"> • Lane & approach awareness 	<p>STAMINA</p> <ul style="list-style-type: none"> • 5-6 times/week <p>STRENGTH</p> <ul style="list-style-type: none"> • 3 times/week <p>SUPPLENESS</p> <ul style="list-style-type: none"> • Daily <p>AGILITY, BALANCE/COORDINATION</p> <ul style="list-style-type: none"> • Perfect 	<p>OPTIMIZE</p> <ul style="list-style-type: none"> • Peak performance • Stress management • Distraction control • Imagery • Relaxation/stimulus • Focus/re-focus • Goal setting
RULES	ETIQUETTE	SAFETY	COMPETITION
<p>APPLY</p> <ul style="list-style-type: none"> • CTF rules • International 	<p>APPLY</p> <ul style="list-style-type: none"> • Lane courtesy • Sportsmanship 	<p>APPLY</p> <ul style="list-style-type: none"> • Ball, shoes, lane, attire 	

Coaches must:

- Monitor all aspects of training to maximize training gains and overall performance goals.
- Involve athletes in all components of planning to ensure buy-in, participation, understanding as well as athletes' responsibility for their performance.
- Aggressively pursue professional development in a variety of formal and informal situations to ensure awareness of new developments in the sport.

Parents/support network should:

- Respect the athlete and the national coach recognizing that the training, competition and recovery plan must be supported for the long-term success of the athlete.
- Encourage communication and collaboration between the local personal coach and the national coach for the benefit of the Train to Win bowler.
- Understand that at international events the bowler has a responsibility to abide by the athlete code of conduct following the instructions or rules of the national coach and manager throughout the competition.

Bowlers must:

- Be accountable for their performances in practice and competition.
- Identify performance goals and strive to achieve these goals.
- Manage distractions to ensure solid performances as the tournament environment becomes more intense and complex.
- Continue to be ambassadors and role models for the Canadian Tenpin Federation at bowling centres and on the international scene.
- Be good communicators with all groups involved in preparation including coaches, medical groups, managers, the National Federation(s), and so on.
- Pursue outside activities that are enjoyable and provide relaxation away from bowling.



Indicators that the bowler will be competitive on the international stage:

- Hit head pin 95%
- Ball remains on the lane 100%
- Complete 6 games
- Make 90-95% of spares
- Strike - 50-60%

NSO/PSO/TSO initiatives:

- National coaches should deliver quality programs across Canada to develop a stronger base of bowlers and athletes by providing information for bowlers of all levels. Also develop a stronger base of coaches with a coach mentoring system.
- Increase the number of training camps for national team members.
- Make bowling centre staff and PSO's aware that they have a national athlete in the community. These athletes should be given opportunities to practice their game for minimal fees since they represent Team Canada.
- Coaches with National Team should be trained and certified for the high performance context.
- Team Canada members should be showcased or marketed effectively so as to educate the public that bowling is more than a "birthday party" or "glow bowl" experience.
- Work with bowling centre proprietors to promote the use of certified and qualified coaches.

KEY RECOMMENDATIONS:

The Train to Win bowler must follow an annual training, competition and recovery plan that is focused on podium performances.

Non-scoring practice sessions must outweigh scoring and competing based on the priorities identified in the annual plan.





Improve technical performance and fitness through participation in social bowling leagues

After learning the basic bowling skills, a bowler may choose to pursue bowling as a recreational and social activity or may progress to higher-level tournaments and leagues. This long-term approach to bowler development promotes personal success in bowling to ensure bowlers remain enthusiastic about the game. The **Bowling for Life** stage is open to all ages. Youth and adults can choose to participate in this less competitive context, participating in league and tournament play at a less intense level. The main objective is life-long wellness and fitness by participating in bowling in a social and fun environment.

Because many life stresses may interfere with a bowler's ability to get to the bowling centre regularly, programs should be adaptable to the needs of individual bowlers.

Age appropriate physical training in the **Bowling for Life** stage is critical as older bowlers often desire fun opportunities for overall wellness. This should include flexibility, adaptable strength training and exercises for balance and coordination.

Components to Focus On

TECHNICAL	TACTICAL	PHYSICAL	PSYCHOLOGICAL
<p>-- BALL SELECTION DEVELOP/REFINE</p> <ul style="list-style-type: none"> • Material • Drilling (tenpin) • Selection and fit • Weight/size <p>-- RELEASE/DELIVERY DEVELOP/REFINE</p> <ul style="list-style-type: none"> • Lift & Turn • Turn & Lift • Hook ball • Curve ball (tenpin) • Back up ball • Lift • Turn • Hand/finger position (grip) • One handed release • Straight ball • Pendulum swing • Follow through • Rotation (5 pin) <p>-- STANCE DEVELOP/REFINE</p> <ul style="list-style-type: none"> • Starting position from foul line • Starting position with target systems • Balance • Ball placement <p>-- APPROACH DEVELOP/REFINE</p> <ul style="list-style-type: none"> • 5-step approach (tenpin) • Foul line position • 1-step approach • 3-step approach (5 pin) • 4-step approach • Timing 	<p>PRACTICE</p> <ul style="list-style-type: none"> • Lane conditions • Carrying adjustments • Striking • Targeting • Spare shooting • Lane & approach awareness 	<p>STAMINA</p> <ul style="list-style-type: none"> • Daily <p>STRENGTH</p> <ul style="list-style-type: none"> • 2 times/week <p>SUPPLENESS</p> <ul style="list-style-type: none"> • Daily <p>AGILITY, BALANCE/COORDINATION</p> <ul style="list-style-type: none"> • Maintain 	<p>PRACTICE</p> <ul style="list-style-type: none"> • Peak performance • Stress management • Distraction control • Imagery • Relaxation/stimulus • Focus/re-focus • Goal setting
RULES	ETIQUETTE	SAFETY	COMPETITION
<p>APPLY</p> <ul style="list-style-type: none"> • CTF rules • CTF rules • International 	<p>APPLY</p> <ul style="list-style-type: none"> • Lane courtesy • Sportsmanship 	<p>APPLY</p> <ul style="list-style-type: none"> • Ball, shoes, lane, attire 	

Bowler should:

- Continue to participate in bowling but ensure physical activity is taking place for 60 minutes a day for 4-6 days per week.
- Continue to make healthy choices for eating at home and at the bowling centre.
- Enjoy all aspects of bowling - practicing, competing, and socializing.
- Seek out coaching and practice the tips received from a qualified coach.

Coaches should:

- Advise bowlers about the purchase of shoes and balls.
- Participate in the Community Coach education program and continue professional development.
- Encourage bowlers to compete in fun tournaments.
- Communicate with staff at the bowling centre to improve programs and to create opportunities for continued development for the bowlers.
- Take advantage of educational and developmental opportunities that are provided by the PSO or NSO.

Parents/support network should:

- Respect the role of the coach or instructor.
- Maintain a long-term perspective about the development of the bowler as an athlete.
- Focus on having fun and participating in an enjoyable sport.
- Understand that practice (non-scoring) and a ratio of 2 practices to 1 scoring opportunity (league and/or tournament) is ideal.
- Encourage cross-training for strength, conditioning and variety.

Bowling centre staff should:

- Be committed to overall promotion of bowling for the future by being professional, businesslike and supportive of bowlers and coaches.
- Be committed to the safety of all bowlers and coaches.
- Provide healthy choices at snack bar.
- Assist with purchases of shoes and balls.
- Ensure that coaches have necessary and appropriate training before working with bowlers.
- Provide all bowlers, regardless of age or stage, the opportunity to receive coaching.

ACTIVE FOR LIFE

- Consider creating affordable opportunities for bowlers who wish to practice outside of league and tournament games.
- Ensure that all lanes meet certification and sanctioning specifications.

Indicators that the bowler is in the game:

- Hit head pin 40-80%
- Ball remains on the lane 50-90%
- Complete 3-12 games
- Make 20-80% of spares
- Strike: 10-50%

NSO/PSO/TSO initiatives:

- Promote fun and participation for everyone.
- Enforce standards & specification for all bowling centers.
- Promote joining local associations for tournament participation as well as individual award programs.
- Offer clinics for bowlers in this stage.
- Promote bowling and educational opportunities to all of the members.
- Work with bowling centre proprietors to promote the use of certified and qualified coaches.

KEY RECOMMENDATIONS:

All bowlers, regardless of the stage they choose, should have the same opportunities to develop their game as they wish.

Strategic initiatives:

1. Institute coaching requirements for various programs and competitions to ensure LTAD stage skills and abilities are being taught effectively.
2. Promote practices that are non-scoring to promote skill development as per the stage objectives.
3. Develop and implement appropriate fitness components to be integrated into all programs at the bowling centre or off-site.
4. Examine programs and assist in modifications to ensure that athletes with a disability are being accommodated and included in the LTAD initiatives.
5. Establish a competition review to promote alignment with the LTAD goals and objectives.
6. Develop a communication and education plan to link up and collaborate effectively with all stakeholders within the Bowling Federation of Canada.
7. Recognize that the Bowling for Life stage has the most participants. Quality and appropriate programming is critical to promote life-long participation in a fun and healthy sport.
8. Phase-in a recommendation that bowlers in the Train to Compete stage follow an annual periodized training plan.
9. Phase-in a requirement that bowlers representing Canada must follow an approved annual periodized training plan.

Conclusion:

The Bowling Federation of Canada - which includes national, provincial, and territorial bowling organizations for tenpin and 5 pin bowling as well as BPAC and Youth Bowling - has a tremendous opportunity to shape an exciting direction that recognizes trends in demographics and implements change based on research in health, fitness and sport. The first important step has been completed by articulating a vision for our sport. The next steps are as important and require the entire bowling community to work together and continue to collaborate on effective implementation strategies at all levels of our sport. These changes do not happen quickly. However, we must start now to ensure our sport remains accessible, relevant and enjoyable.

GLOSSARY:

ADAPTATION refers to a response to a stimulus or a series of stimuli that induces functional and or morphological changes in the organism. Naturally, the level or degree of adaptation is dependent upon the genetical endowment of an individual. However, the general trends or patterns of adaptation are identified by physiological research, and guidelines are clearly delineated of the various adaptation processes, such as adaptation to muscular endurance or maximum strength.

ADOLESCENCE is a difficult period to define in terms of the time of its onset and termination. During this period, most bodily systems become adult both structurally and functionally. Structurally, adolescence begins with an acceleration in the rate of growth in stature, which marks the onset of the adolescent growth spurt. The rate of statural growth reaches a peak, begins a slower or decelerative phase, and finally terminates with the attainment of adult stature. Functionally, adolescence is usually viewed in terms of sexual maturation, which begins with changes in the neuroendocrine system prior to overt physical changes and terminates with the attainment of mature reproductive function.

ANCILLARY CAPACITIES refer to the knowledge and experience base of an athlete and includes warm-up and cool-down procedures, stretching, nutrition, hydration, rest, recovery, restoration, regeneration, mental preparation, and taper and peak.

The more knowledgeable athletes are about these training and performance factors, the more they can enhance their training and performance levels. When athletes reach their genetic potential and physiologically cannot improve further, performance can be improved by using the ancillary capacities to full advantage.

CHILDHOOD ordinarily spans the end of infancy — the first birthday — to the start of adolescence and is characterized by relatively steady progress in growth and maturation and rapid progress in neuromuscular or motor development. It is often divided into early childhood, which includes pre-school children aged 1 to 5 years, and late childhood, which includes elementary school-age children, aged 6 through to the onset of adolescence.

CHRONOLOGICAL AGE refers to “the number of years and days elapsed since birth”. Growth, development, and maturation operate in a time framework - that is, the child’s chronological age. Children of the same chronological age can differ by several years in their level of biological maturation. The integrated nature of growth and maturation is achieved by the interaction of genes, hormones, nutrients, and the physical and psychosocial environments in which the individual lives. This complex interaction regulates the child’s growth, neuromuscular maturation, sexual maturation, and general physical metamorphosis during the first two decades of life.

CRITICAL PERIODS OF DEVELOPMENT refers to a point in the development of a specific behaviour when experience or training has an optimal effect on development. The same experience, introduced at an earlier or later time, has no effect on or retards later skill acquisition.

DEVELOPMENT refers to “the interrelationship between growth and maturation in relation to the passage of time. The concept of development also includes the social, emotional, intellectual, and motor realms of the child.” The terms “growth” and “maturation” are often used together and sometimes synonymously. However, each refers to specific biological activities.

GROWTH refers to “observable, step-by-step, measurable changes in body size such as height, weight, and percentage of body fat.”

MATURATION refers to “qualitative system changes, both structural and functional in nature, in the organism’s progress toward maturity - for example, the change of cartilage to bone in the skeleton”.

PEAK HEIGHT VELOCITY (PHV) is the maximum rate of growth in stature during a growth spurt. The age of maximum velocity of growth is called the age at PHV.

PEAK STRENGTH VELOCITY (PSV) is the maximum rate of increase in strength during growth spurt. The age of maximum increase in strength is called the age at PSV.

PEAK WEIGHT VELOCITY (PWV) is the maximum rate of increase in weight during growth spurt. The age of maximum increase in weight is called the age at PWV.

PHYSICAL LITERACY refers to the mastering of fundamental motor skills and fundamental sport skills.

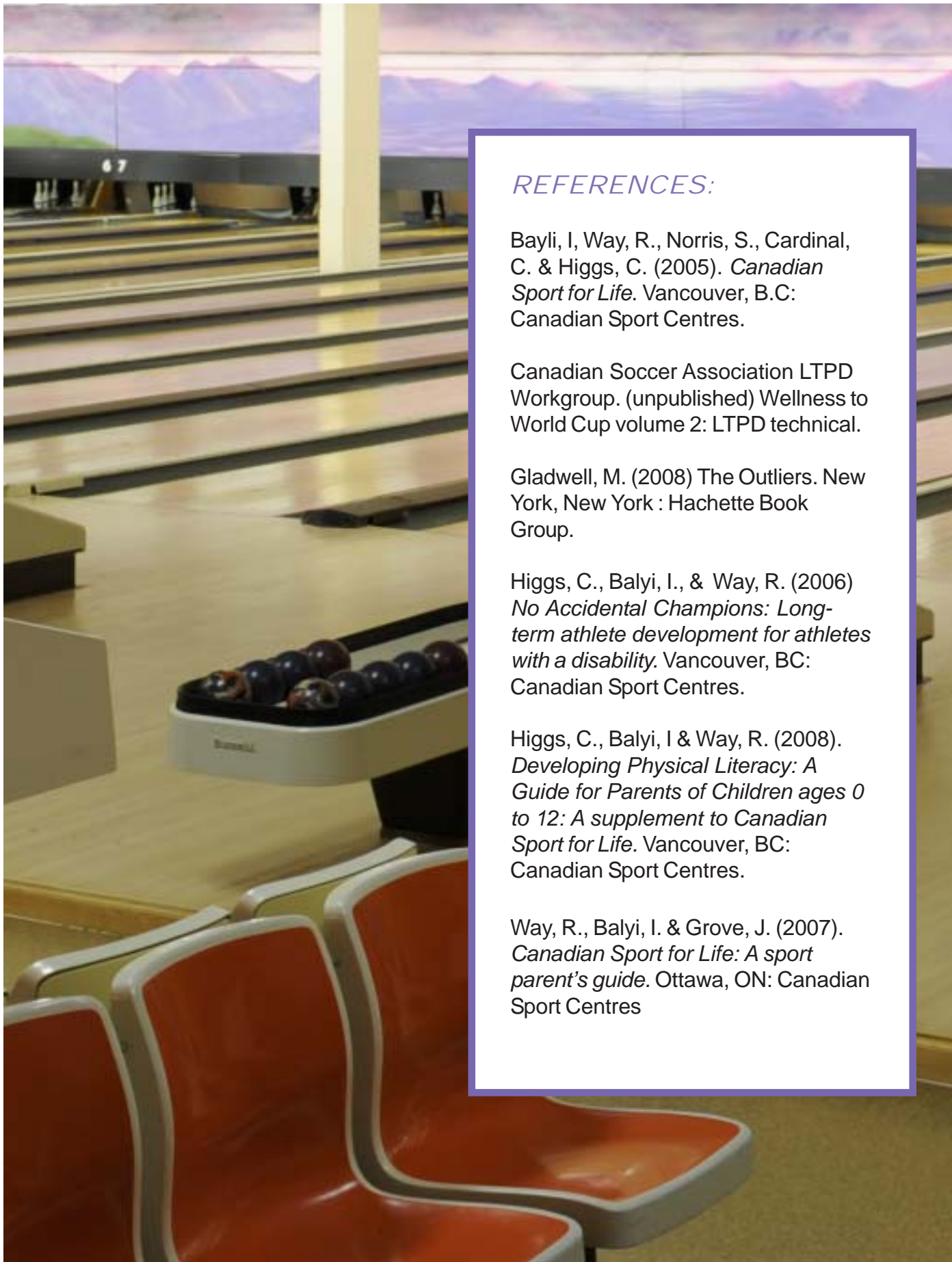
POST-NATAL GROWTH is commonly, although sometimes arbitrarily, divided into three or four age periods, including infancy, childhood, adolescence, and puberty.

PUBERTY refers to the point at which an individual is sexually mature and able to reproduce.

READINESS refers to the child’s level of growth, maturity, and development that enables him or her to perform tasks and meet demands through training and competition. Readiness and critical periods of trainability during growth and development of young athletes are also referred to as the correct time for the programming of certain stimuli to achieve optimum adaptation with regard to motor skills, muscular and/or aerobic power.

SKELETAL AGE refers to the maturity of the skeleton determined by the degree of ossification of the bone structure. It is a measure of age that takes into consideration how far given bones have progressed toward maturity, not in size, but with respect to shape and position to one another.

TRAINABILITY refers to the genetic endowment of athletes as they respond individually to specific stimuli and adapt to it accordingly. Malina and Bouchard (1991) define trainability as “the responsiveness of developing individuals at different stages of growth and maturation to the training stimulus.”



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