



## 10 Key Factors of LTAD

Every group that delivers basketball across this country is encouraged to look deeply at their existing practices and make decisions on what is best for the future in the sport of basketball. There are ten key factors of LTAD under which each group should examine their current practices:

### 1. FUNDamentals

All participants need to learn basic fundamental movement skills at the appropriate stages of development. Since the nervous system develops fast in children, movement skills that involve the nervous system need to be active at this time. These include the ABC's of agility, balance, coordination and speed. If children do not learn these at the appropriate time in their development, they might not reach their fullest potential in the future. We must recognize the difference between physical literacy and physical activity. Physical literacy is the development of fundamental movement skills and fundamental sport skills that permit a child to move confidently and with control, in a wide range of physical activity, rhythmic (dance) and sport situations. Physical literacy also includes the ability to "read" what is going on around them in an activity and react appropriately to those events. This also means a child is able to effectively move the body in all planes of the body

(See [www.ltad.ca](http://www.ltad.ca) ; Developing Physical literacy: A Guide for Parents of Children Ages 0 to 12). The physically active child is energetic and on the go. This is important for maintaining health. The problem is that if a child does not learn how to move properly he/she limits their choices of physical activity at a later stage of LTAD. For example; if a child's only physical activity is walking at a younger stage what sports may this child move into in later life?

### Recommendations:

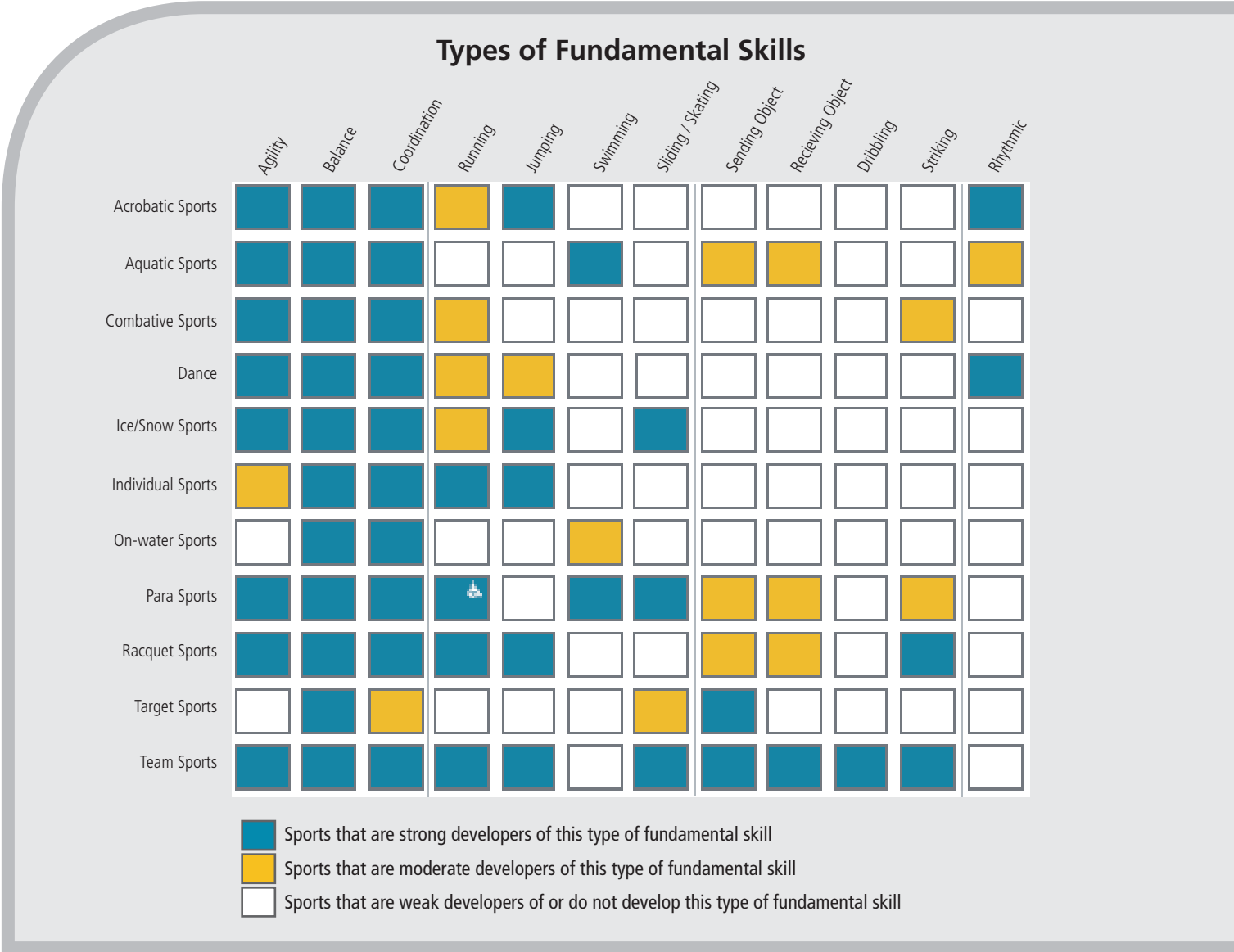
- Education of parents, coaches and administrators is crucial. Informed parents will demand this be delivered to their children: (See [www.ltad.ca](http://www.ltad.ca); Canadian Sports for Life: A Sport Parents Guide and [www.basketball.ca](http://www.basketball.ca): Basketball Parent Guide for LTAD);
- Develop templates that assist the above mentioned people to plan and implement appropriate fundamental movement development;
- Develop resources that show how these movement skills can be properly taught in a fun way. Many fun playground games naturally teach these skills. It is not always about drills;
- Work to develop relationships across other sports that are delivering sport at these stages of LTAD;
- Fundamental movement needs to be a part of warm up and early season training at all stages of LTAD;
- Athletes need individualized training that focuses on improvement of areas of weakness. Fundamental movement skills cannot always be taught en masse as each child is different.

### Rationale:

- Every child is an athlete and needs the proper grounding in movement in order to develop an appreciation for physical activity and therefore derive the health benefits. This will also let them make wiser decisions as to which pathway of sport to choose;
- Educated people will aid in the implementation of LTAD;
- Many weaknesses of sport-specific skills can be linked to ineffective or poorly developed movement skills. If the movement skill is not corrected first, the sport skill will suffer. A basketball example is the lay up. If a child has problem with skipping, a fundamental movement, he/she will struggle to develop the proper rhythm in executing a lay up.



Figure 3 Sports That Contribute to the Development of Fundamental Skills





## 2. Specialization

Early specialization in a late-specialized sport, like basketball, has been shown to lead to:

- One-sided sport-specific preparation;
- Lack of the basic fundamental movement skills;
- Overuse injuries;
- Early burnout;
- Early retirement from training and competition and often withdraw from physical activity.



Specialization is not only the concept of specialization in one sport; it is also specialization within the sport. Basketball has continually forced the tall player to play in the “post.” Often this has meant the adolescent was not been allowed to use all of the skills required to play the game at the later stage of LTAD, when other late maturing players catch up and some times pass this player. Specialization has also occurred in our training sessions where coaches tend to focus more on team development rather than player development.

### Recommendations:

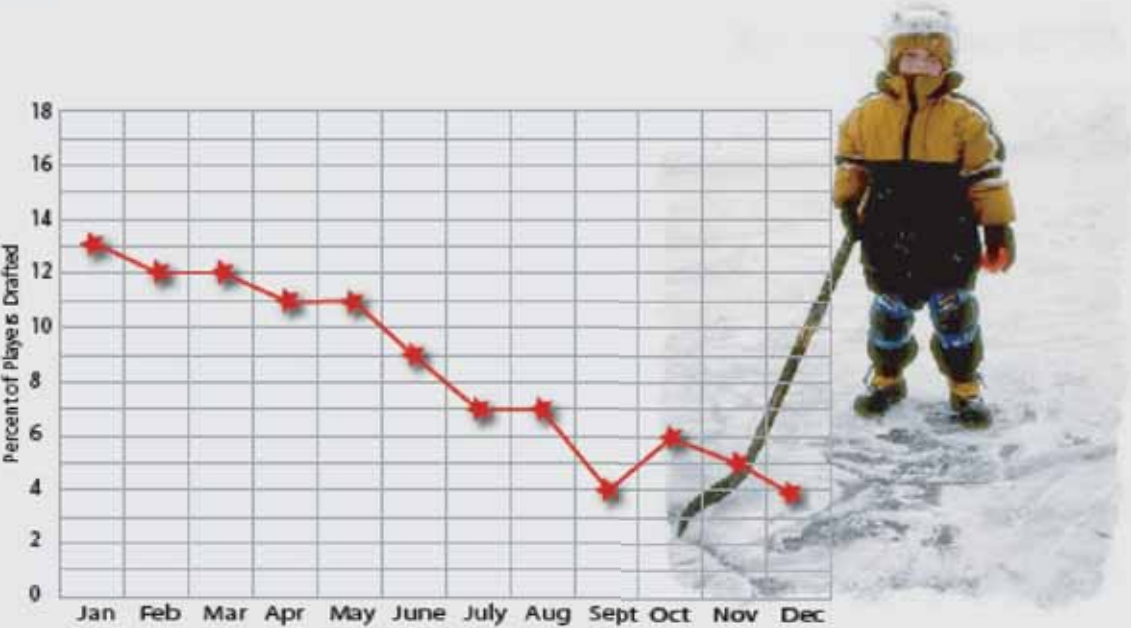
- During the FUNdamental, L2T and T2T stages of LTAD we need to develop “global” players. These are players who have worked on all the skills and have trained to play every position;
- Individualized training also includes defensive work. A global player also needs to be able to defend all positions on the floor;
- Make use of offences and defences that encourage flexible positioning in the developmental stages of LTAD;
- Review our current elite system. Are we selecting provincial/ national teams too early?;
- Fundamental movement skills need to be part of daily warm ups in training and in competition;
- Strategies need to be developed that allow for coaches to account for early, average and late maturers;
- Strategies need to be developed to help with athlete identification vs. athlete selection. Currently we are selecting from the players who “show up” to try out. We need to identify future players and ensure that they receive the proper multi-skilled training at the early stages of LTAD. Many are exiting our sport in the later stages of LTAD or arrive there without the necessary skills need to compete;
- Means must be found to include athletes with a disability in all stages of programming. Resources need to be developed to show coaches how this can be accomplished.

### Rationale:

- Every child is an athlete and needs the proper grounding in movement in order to develop an appreciation for physical activity and therefore derive the health benefits. This will also let them make wiser decisions as to which pathway of sport to choose;
- The inability to detect the “great athlete” until after maturity;
- Reduce boredom, frustration, burn outs and drop outs;
- Ensure that all children develop the skills necessary to play at the next stage of LTAD if they wish to.



**Figure 4** Distribution of Birthmonths of Drafted Ontario Hockey League, Western Hockey League, and Quebec Major League Players





### 3. Developmental Age

We must recognize that not all children grow and mature at the same rate. Females also mature faster than males, on average. There is a tendency to apply adult models of sport on children. Too often it is the early maturing athlete who gets to make the elite teams during puberty. This is often based on the fact that the early maturing athlete is more aggressive and can physically dominate the other players. Research has shown that very often the late maturing children become the superior athletes since they have more time to develop the fundamental movement skills and fundamental sport skills. Also the early maturing athlete, who relies on aggression and strength, often does not learn the skills at a younger age. They do not develop the coping skills needed to survive elite sport when the physical maturity playing field is level.

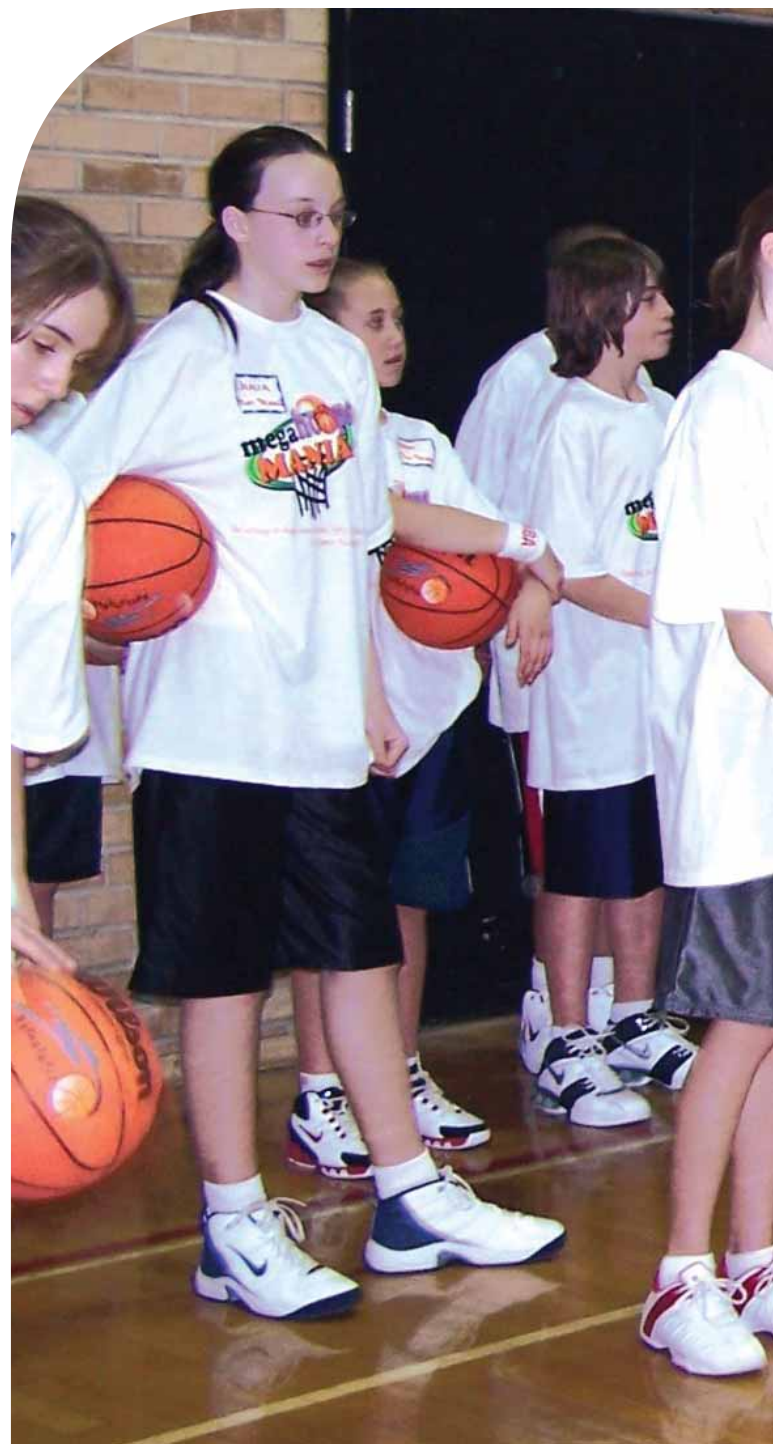
Leagues and associations that use chronological age for cut off dates, build in a natural bias to players born prior to the cut off date. If the cut off date is January 1st those players born in December are often one year less mature and therefore are often not selected. Statistics from many sports show this bias in their participation numbers. There is a big concern with the drop out rate of females from sport in their early teens.

#### Recommendations:

- Apply the LTAD wall chart to monitor growth;
- “Mine the data” - all associations need to look at their data to see if age-based biases are being created in their delivery system;
- “Mine the data” to see if male and female biases occur. What impact does co-ed programming have on the retention of females in sport? Special programs must be developed to keep female athletes involved;
- Use single age categories instead of multi-year;
- Educate parents, teachers, coaches and administrators (developmental age and relative age);
- Give templates to the above parties to allow them to easily implement LTAD appropriate training;
- Show coaches and teachers how training of early, late and average matures can be implemented in a team situation;
- Give opportunities for late maturing athletes to be involved in “select” programs;
- Re-evaluate and re-visit the rationale behind national/provincial championships during developmental stages;
- Develop ways to remove the age bias. For example; age on date for competitions;
- Individualized training must reflect the needs of the child;
- We must find a balance between what is appropriate for the child or adolescent in regard to their physical development and their social/emotional needs.

#### Rationale:

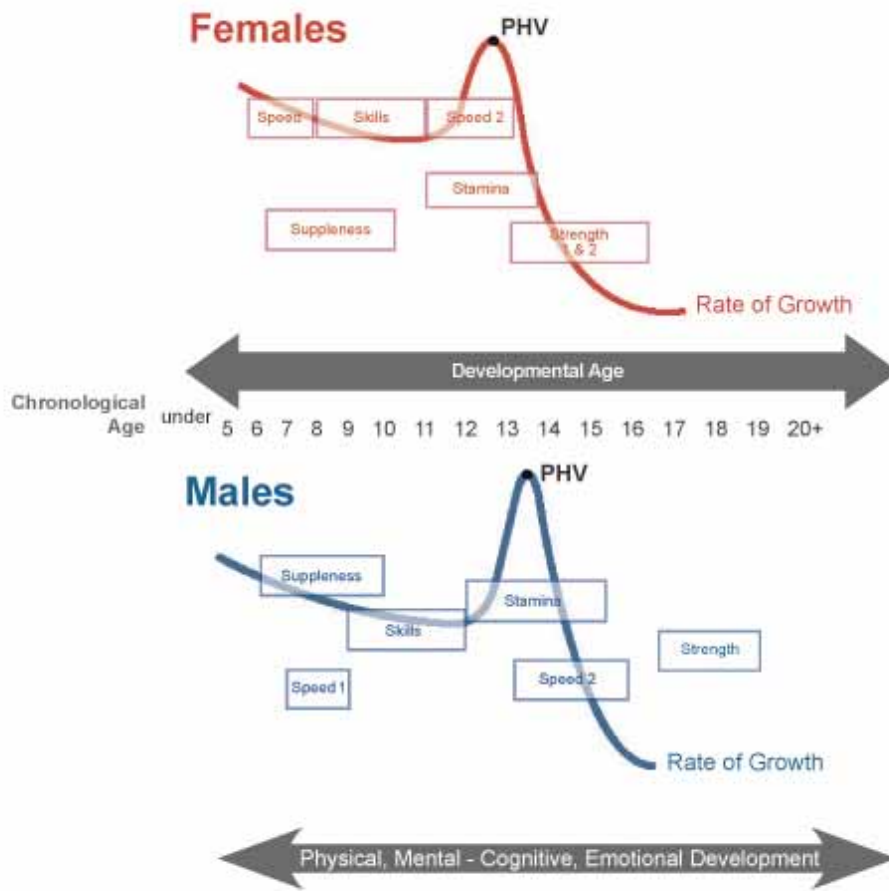
- Every child is an athlete and needs the proper grounding in movement in order to develop an appreciation for physical activity and therefore derive the health benefits. This will also let them make wiser decisions as to which pathway of sport to choose;
- Many late maturing athletes are dropping out of basketball before they have a chance to excel and withdraw from all sports and physical activity;
- Too many females are leaving sport.



- Windows of Trainability refers to the sensitive periods of accelerated adaptation to training, which occurs prior, during and early post puberty.
- All systems are always trainable, thus the windows are always open; however a window is fully open during the sensitive periods of accelerated adaptation to training and partially open outside of the sensitive periods.



**Figure 5** Pacific Sport - Windows of Optimal Trainability (Balyi and Way 2005)





## 4. Trainability

The majority of coaches worldwide currently design long and short-term athlete training models, as well as competition and recovery programs based on their athletes' chronological age. However, research has shown that chronological age is a poor basis for athlete development models, since the musculo-skeletal and emotional development of athletes between ages 8 and 16 can vary greatly within any given age category. Superimposing a scaled-down version of athlete training and competition models designed for adults is not a good alternative.

Ideally, coaches would be able to determine the biological age of their athletes and use this information as the foundation for athlete development models. Unfortunately, there is no reliable non-invasive procedure to identify biological age. So what can be done to remedy this situation?

One practical solution is to use the onset of the growth spurt or Peak Height Velocity (PHV) as a reference point for the design of optimal individual programs with relation to sensitive periods of trainability. Peak Height Velocity (PHV) is the age at which the rate of growth is fastest.

Prior to the onset of PHV, males and females can train together and chronological age can be used to determine training, competition and recovery programs. The average age for the onset of PHV is 12 and 14 years for females and males, respectively.

The term trainability refers to the genetic endowment of athletes, as they respond individually to specific training methods and how they adapt to them. In an athlete's development there are sensitive periods of accelerated adaptation to improvements of endurance, strength, speed and skill, which are often not considered during planning. But these periods are windows of opportunity and must be capitalized upon. They are important to recognize because it is during these sensitive periods, that children and adolescents are physiologically most receptive to acquiring skills and/or improving specific physical attributes such as strength, and endurance.

*There are three chronological and two biological markers to indicate the sensitive period.*

### Research in this area indicates that:

- The sensitive periods for the accelerated improvement of speed and power occur for males between ages 7 and 9 and between ages 13 and 16. For females these occur between age 6 and 8 and between age 11 and 13 (chronological age);
- There is an accelerated improvement for endurance capacities after the onset of Peak Height Velocity (PHV);
- There is an accelerated improvement in strength 12 to 18 months for males after PHV occurs;
- There is an accelerated improvement in strength immediately after PHV occurs and/or the onset of the menarche (the onset of the menstrual cycle occurs usually one year after PHV);
- The sensitive period for motor skill development occurs between ages 8 and 11 for females and between ages 9 and 12 for males. Basic motor skills such as the ABC of Athletics (running, throwing, hopping, bounding and jumping), the ABC's of Athleticism (agility, balance, coordination and speed) form the basis for all sports. By age 11 or 12, or more precisely before the onset of the growth spurt, children should be able to perform these skills proficiently;
- There is full consensus among experts in this area that if physiological abilities are not developed during the sensitive periods, the opportunity for optimum development is lost and cannot be fully retrieved at a later time;
- The onset of PHV and PHV (after growth decelerates) are the reference points for optimal training programs for the development of athletes. Otherwise, adult training programs tend to be superimposed on young athletes with less than optimal outcomes;
- We need to make use of the sensitive periods and develop basic athletic skills and attributes. Once these are mastered, we can go on to introduce and develop more specialized sports specific skills.

### Recommendations:

- Education - all parties need to know when the windows are, why these exist and what is appropriate training;
- Develop a resource that will make it easy for coaches and teachers to apply LTAD appropriate training;
- Make use of the LTAD wall chart to monitor PHV;
- Recognize that males and females grow at different rates;
- Reduce competition schedule to actually allow athletes to train;
- Individualized training plans;
- Avoid some traditional practices such as;
  - long slow distance running as the only method to improve aerobic capacity,
  - static flexibility training pre and post activity,
  - the use of strength training with heavy weights at inappropriate times,
  - lack of speed training in all phases of training.

**Rationale:**

- Every child is an athlete and needs the proper grounding in movement in order to develop an appreciation for physical activity and therefore derive the health benefits. This will also let them make wiser decisions as to which pathway of sport to choose;
- Trainability is based on scientific research;
- It allows our athletes to maximize their potential.



## 5. Physical, Mental, Cognitive and Emotional Development

More than just fitness and the skills of the game need to be addressed. All areas of an athlete's development must be included in sport programs. Training, competitive and recovery programs should consider mental, cognitive and emotional development of each athlete. Decision making is a major point of emphasis. A major objective of LTAD is a holistic approach to athletic development. This includes emphasis on ethics, fair play and character building throughout the various stages, an objective that reflects Canadian values. Programming should be designed considering the athlete's cognitive ability to address these concepts.

**Recommendations:**

- All deliverers of basketball programming need to review how they are currently developing the physical, mental and social/emotional abilities of their athletes. Also, how are ethics and values being taught and modelled within the organization;
- Decision making or "when" to use skills is to be emphasized at all stages of LTAD. This is based on keys that the athlete detects, not on coaches' commands;
- Coaches need to progress athletes through the various stages of LTAD with the goal of creating a self-reliant athlete who has the physical, mental and social/emotional skills to make their own decisions on their future;
- Work needs to be done in accounting for the differences between female and male athletes;
- We must recognize that athletes with a disability may require special attention;
- Templates need to be developed to aid all parties in delivering holistic training;
- A key component of the new NCCP is the holistic approach;
- Mental and emotional/social training needs to be delivered in conjunction with the physical training. It cannot be seen as an "add on" done outside the practice and competition site;
- Individualized training plans;
- Rewarding players solely on the basis of their physical superiority can lead to societal problems in the future. This has occurred mostly on the male side of the sport, but is becoming a problem on the female side also. Associations must check to see what "subliminal" messages are being sent through team selections, scholarships and awards.

**Rationale:**

- Every child is an athlete and needs to develop skills, knowledge and comfort in all areas in order to make the best decision in the future for their own well being;
- Canadians believe that sport has a more important role; more than just producing winners and losers. It has a key role in developing future leaders and positive members of society.





## 6. Periodization

Periodization is time management. It provides the framework for arranging all of the pieces in an athlete's training. In order for athletes to develop, they need to plan their training in a more scientific way. At a simpler level it helps recreational athletes manage their time more effectively and ensures that they are covering all components required for a healthy lifestyle. Proper periodization provides a plan that can be evaluated in the future. This evaluation helps guide future plans. Currently the majority of coaches base their plans on past practices and on the competition schedule. More individualized plans must be developed for athletes even in team sports. Coaches need to be shown ways to maximize the training time they have with their athletes.

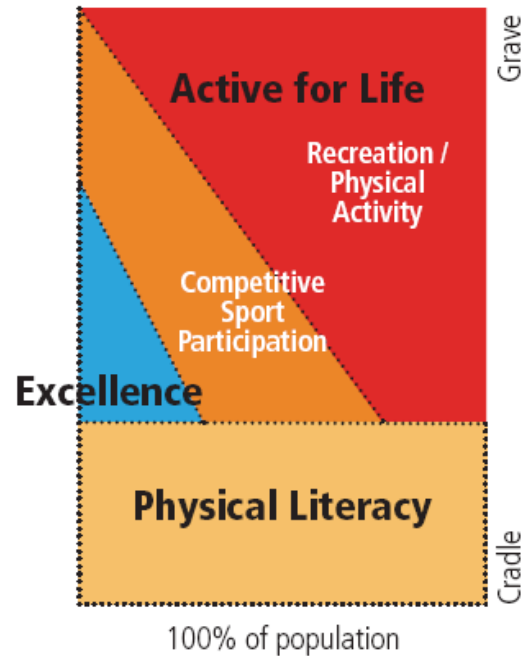
### Recommendations:

- Educate all parties as to the benefits of periodization;
- Work with the "experts" to develop more team sport friendly periodization. Much of the current research is based on individual sports and is not easily adaptable to the team sport environment;
- Develop templates that show coaches how use periodization at each stage of development. Also coaches need to be made aware of what to avoid. For example; as the "big" games approach late in the season, coaches should reduce the volume of practice, not increase the length of practice to prepare for the opponent;
- More work must be done to understand the female athlete. We cannot continually push male models onto our female athletes;
- Monitor plans with a "scientific eye" to make decisions on future revisions to the templates;
- Periodization will be part of the new NCCP coaching education;
- Seasons of play must be developed in conjunction with the various deliverers of basketball so that proper periodization can occur;
- We need to establish a positive working relationship with school-based basketball in order to implement proper periodization;
- Individualized training and recovery need to be reflected in the periodization plan;
- Work with other sports to develop proper periodization with the multi-sport athlete at the beginning stages of LTAD.

### Rationale:

- In order to maximize an athlete's potential, proper planning must occur in order to ensure all components are met;
- Constantly monitor the plan;
- Innovations and improvements should be monitored to judge their effectiveness;
- All children need to learn time management and planning as a future life skill.

**Figure 6 Source:** Canadian Sport For Life: A Sport Parent's Guide



## 7. Calendar Planning for Competition

The basketball delivery system consists of three streams: health of the nation, develop the game and compete for the nation. Another stream has crept into the delivery system that is beginning to dominate the development stage. We call it “competitive basketball.” In this stream, games between 2 teams dominate. Some players are not receiving sufficient time for training. When practice to competition ratios are at a 1 to 1 or 1 to 2 ratio, quick development may occur, but performance always plateaus later. Coaches may claim that the team improves, but players are not able to work on their fundamental movement and basketball skills. Mental and social/emotional training often gets ignored. Training is dominated by strategies and tactics in preparation for the next game. In many situations, players are not receiving quality playing time. Players therefore do not get an opportunity to use their skills; they lose conditioning, lose interest and drop out of the sport at the younger stages. Often these are late maturing athletes. Our children are currently playing too many games without enough quality training. We have adopted adult models for youth sport. All sports must get a handle on this situation.

*Planning and implementing of an optimal competition structure for all stages is the biggest challenge facing team sports in our country.*



### Recommendations:

- Education of all stakeholders in the importance of proper practice to competition ratios;
- Develop strategies to access and make better use of facilities;
- Share “best practices” that are occurring within the basketball community, but also across sports;
- Develop a positive working relationship with schools in order to work together to implement LTAD;
- Reward programs and coaches who adhere to LTAD. We must ensure that “hidden” messages are not being sent through our competition rules that encourage coaches and leagues to violate LTAD principles. Very often when associations adopt season of play without restricting the number of games, coaches attempt to “load up” with the same number of games as were played in the past;
- Improve coaching education through the new NCCP;
- Reward coaches who consistently improve players individually over time;
- Assist coaches in the concept of “training through competition.” The outcome of all games is not treated as important. Some games are designed as training;
- Coaches also need to recognize the amount of time that can be used for teaching by using warm up and half times as training and teaching time.

### Rationale:

- In order to allow athletes to develop holistically in all areas, they need time to train. Athletes do not develop all of the important skills they need at the later stages of LTAD by playing games;
- Sport needs to develop the school model. Students go to class to learn the skills. The game is the time to exhibit their mastery of the skills. Lessons learned at a younger age are built on in a progressive nature leading the developing child to the adult stage of competency;
- Every child, even those who just want to play recreational sports, needs to develop the important movement skills at the right time in their development;
- Too many “adult”-like games with the emphasis on winning has been shown in study after study as the main reason for youth to quit sport.



## 8. The 10-Year Rule

Scientific research has shown that it takes a minimum of 10 years of training for a talented athlete to reach elite levels. The trap is that many people believe that early specialization is what is needed to make this happen. “If I start young then I will be better sooner.” The opposite is actually true. Most athletes only have 10 years at an elite level. If you specialize too early the likelihood of staying in the sport is diminished.

### Recommendations:

- Delay specialization until the appropriate time;
- Focus on multi-sport skills in the pre-PHV (before the onset of the growth spurt during puberty) stages;
- Move to specialization in basketball after PHV. Position specialization should occur later during the T2C stage;
- Education of the parents, coaches and players is crucial to assist them in making appropriate decisions;
- To be an elite athlete you will eventually need to specialize in your chosen sport;
- Training includes multiple positive repetitions of the skills of the game. You do not become a great ball handler, passer and shooter through playing the game. Self-practice has always been a key to becoming great in these areas;
- Develop relationships with other sports to stop the vicious cycle of competing for younger and younger athletes.

### Rationale:

- Every child is an athlete and needs the proper grounding in movement in order to develop an appreciation for physical activity and therefore derive the health benefits. This will also let them make wiser decisions as to which pathway of sport to choose;
- When athletes reach the point where they need to specialize they will have the foundation required to excel at their highest level and the mental freshness to put in the required time;
- Poor decisions are being made too early in a child’s development. This leads to a diminished number of athletes staying in the sport in the later years when they can specialize.
- To avoid burn out at an early age;
- To avoid overuse injuries;

## 9. System Alignment and Integration

Groups cannot work in isolation. Sport Canada is facilitating all delivery agencies of their sport to become aligned. Players/athletes do not remain in the same delivery system throughout their entire sporting experience. Players/athletes, coaches, officials and administrators should be able to move seamlessly from one delivery system to the next. One rule set is the best example of aligning our system. Participants need to see clear pathways for players, coaches, officials and administrators. There needs to be various entry points. These pathways must be available for all three streams of sport: health of the nation, develop the game and compete for the nation.

System alignment also involves integrating all of the ancillary groups into the sport system. This includes such groups as the sport scientists, trainers, managers, sponsors, etc.

### Recommendations:

- Continue the movement towards one rule set;
- Formation of an LTAD rules committee to look at modifications for each stage of development;
- Continue to grow ways to bring the basketball community together;
- Work to develop positive working relationships with all deliverers of basketball;
- Continue to educate the grassroots as to the importance of LTAD;
- Distribution of the basketball specific LTAD posters;
- Develop resources to enhance sharing;
- Engage all partners in the process;
- Engage all levels of government to assist in aligning the system.

### Rationale:

- Without an aligned system we can not impact the “game”;
- Sport Canada is moving to accountability. LTAD alignment is one of the key factors. Provincial sport organizations are also moving to the implementation of LTAD. This will move across ministries (i.e. health and education at the provincial level, sport and wellness at the federal level);
- An aligned system allows basketball to be a leader and have a positive influence in all areas of the Canadian Sport System and society.

## 10. Continuous Improvement (Kaizen)

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Basketball must continue to respond to research that keeps them up to date. We need input from all partners. Basketball has a sport science and medical program plan (SSMP) and is continuing to build Integrated Support Teams (IST). These are groups of world class experts who provide information to the coach on the most recent and up to date material.

Group decisions are made that produce the best possible training for the athletes. No one can be the expert on all areas of a sport. We must also constantly “mine the data” to share best practices within our sport and from other sports. Change is brought about through improvement and innovation. These must be monitored to evaluate their effectiveness.

### Recommendations:

- Advisory committees need to be established to analyze current practices. These committees should be a cross section of the basketball community. It is not wise to have all members from a similar background and specialists in the same stage of LTAD;
- Action plans need to be developed to determine implementation strategies;
- Measurements need to be taken to determine the impact of the strategy;
- Constant monitoring needs to be done;
- Best practices need to be shared across the country;
- Sport-specific research needs to be done to explore the concepts and ideas that are currently in use.

### Rationale:

- LTAD is a living, growing process, without constant monitoring it becomes another “flash in the pan”;
- By engaging all parties in the process they take ownership of LTAD.

