Long Term Athlete Development Model

Table Tennis 4 Life

Table Tennis Canada
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PRESIDENT LETTER

The document you are currently holding is the result of a multi-year process that involved coaches, volunteers and staff from across Canada. The Canadian push for a Long Term Athlete/Participant Development Model throughout all sports guided this process.

As a ‘long-term’ president of Table Tennis Canada, whose term is coming to an end, I am happy to see this document completed. I appreciate the quality, the expertise and the enthusiasm that has gone into this product, and the potential that it has for changing table tennis in Canada into a better organized and more dynamic sport; not least the implementation of the ‘Plan’ described in this document has the power to produce generations of world class table tennis athletes if provinces, clubs, coaches, parents and, of course, athletes cooperate in the execution of the Plan.

The implementation of the Model will touch on all aspects of Table Tennis Canada - competition and training, coaching education, officials education and the volunteer leadership of the association which must be open to change and support change to assist the implementation of the LTP/PD Model.

As with every new approach, there will be skeptics and people who will resist change. Whenever I think of them I am reminded of the words of our ‘Sport Canada LTAD’ guide who confronted skeptics with “We will outlast you!”

In this spirit I wish us courage and strength in our quest to bring table tennis in Canada to a higher level.

To those who have worked on putting this document together, I say ‘well done.’ To those who will use this document as their plan, their guide and their inspiration, I wish you every success.

Sincerely,

H. Bruce Burton
President,
TTCAN
Where are we now?
In 2010 Canada places in the mid 30s on the ITTF World Team Ranking list with a new generation of athletes.
Domestically, Canadian table tennis has a national competition system with 5-6 national competitions (Canadian Championships, National Team Challenge and Canada Cup competitions). The current challenge is to link the more or less developed provincial competition structures with the national competition system, e.g., create systems on the regional and provincial level. (The implementation of the LTP/AD model will provide a perfect opportunity to meet this challenge head-on.)

Between 2003 and 2010, Canadian junior athletes won medals at the World Junior Championships, the World Cadet Challenge, the World Junior Circuit Finals as well as in numerous World Junior Circuit events.

Coaches:
As with table tennis players in Canada, many of the coaches in Canada have acquired their expertise elsewhere and brought this ‘free capital’ as immigrants with them to Canada. While this situation is not without its difficulties, the knowledge and expertise immigrant coaches bring to the system has raised the standard of Canadian table tennis considerably.

As a result, Canada has higher and better coaching expertise than most countries with a comparable population.

Facilities/equipment:
Canada has no shortage of world class equipment due to a number of programs associated with the national competition structure and the international hosting policy. Training and competition facilities, however, are sub-par with very few exceptions. This is a reflection of a general sport infra-structure deficit which currently stands in the way of fast progress in Canadian sport.

Sport Medicine & Sport Science:
Access to Sport Medicine programs is available through the Canadian Sport Center structure. However, with the exception of the National Training Centre and the Canadian National Team sport science is given little attention.

Why do we need a LTP/AD plan?
6 to 12 years… When we think about what we want to achieve in 2016 or 2020, we must find a way to translate (and surpass) the results of our cadet and junior athletes into the senior age category.

If Canadian table tennis athletes reach their peak between 25 and 35, the targeted athletes are between 15 and 25 years in 2010. While the base for these athletes can be in Canada, much of their development in well developed table tennis countries in Europe or Asia where access to high level training partners and competition is considerably easier than in North America.

Why the need for change?
The need for LTP/AD arises from a lack of a funded Canadian model for the development of table tennis athletes. Such a model must extend from talent identification to a coordinated training and competition model for highly motivated and talented athletes; it includes aspects such as age appropriate training hours, training activities, competition frequency; coach competency, integrated support teams, life skill and time management education, etc.

10 key factors influencing LTP/AD
- The 15-year Road
- Fundamentals
- Specialization
- Developmental age
- Trainability
- Physical, Mental, Cognitive & Emotional Development
- Annual Training, Competition & Recovery Plans
- Calendar Planning for Competition
- System Alignment and Integration
- Continuous Improvement
Where do we want to be in 2016–2020?

**Competition Results**
Compete for Podium at World Championships and Olympic Games with a focus on the team competition.

**Training**
Fully exhaust the Center of Excellence structure with full integration of training and school for athletes up to the end of the Junior age; full-time coaching and full use of Integrated Support Teams and technical innovations.

**National Competition System**
North American Cup series with regional/provincial feeder divisions in place. Maintain and improve the currently existing competition structure.

**Participants/athletes**
10,000 active competition players with an increased standard of play. New immigrant players should find it much more difficult (than in 2010) to make provincial squads and the national team.

**Coaches**
Take better advantage of the expertise of immigrant coaches to learn from their expertise and experience and build a Canadian coaching model of even higher quality.

**Parents**
Involve more parents in the education of the media and the community about table tennis. This will give parents the knowledge and experience to assist their children in choosing table tennis as a high-level sport career.

**Leadership**
A mix of volunteer and professional leadership that is knowledgeable, effective and forward-looking in the development of table tennis in Canada.

**Facilities/equipment**
Maintain the high quality of equipment and its systematic distribution throughout Canada. Have access to high-level, high-quality training and recreational table tennis facilities throughout Canada.

**Sport Medicine and Sport Science**
Have access to dedicated Sport Medicine programs at provincial, regional and the national level. Use current technology for coaching, planning and analyzing technical and competition elements. Continue the development of new sport science projects.

What is the LTP/AD Plan?
This overview document has been built on an examination of relevant literature and on discussions among table tennis experts. It expresses a shared vision and a vehicle for change. It is the starting point to the pursuit of international excellence.

The Table Tennis Long Term Athlete Development Model/TT4L model integrates training, competition and recovery programming in relation to biological development and maturation; builds excellence on a broad recreational base; embraces a model that is participant/athlete centered, coach driven and officials, parents, administration, sport medicine & sport science and sponsor supported.

The model includes:
- 8 Pillars for Building the Future: How to reach our goals
- The 7 LTP/AD stages of Table Tennis
- LTP/AD Framework - 10 key factors influencing LTP/AD

<table>
<thead>
<tr>
<th>LTP/AD Stages of Table Tennis</th>
<th>Active for Life BUILDING THE FUTURE ON 8 PILLARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Active Start (age 3-6)</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Fundamentals (age 5-9)</td>
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<tr>
<td>Stage 3</td>
<td>Learning to Train (age 8-12)</td>
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<td>Stage 4</td>
<td>Training to Train (age 11-15)</td>
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<td>Stage 5</td>
<td>Training to Compete (age 14-21)</td>
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<tr>
<td>Stage 6</td>
<td>Learning to Win (age 20-25)</td>
</tr>
<tr>
<td>Stage 7</td>
<td>Living to Win (age 25+)</td>
</tr>
</tbody>
</table>

To achieve the highest level of excellence in table tennis all involved must pull in the same direction. There are 10 positive reasons for implementing the LTP/AD framework:

<table>
<thead>
<tr>
<th>Reason</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To establish a clear development pathway for table tennis participants/athletes</td>
<td>6. To serve as a planning tool, based on scientific research, for coaches and administrators</td>
</tr>
<tr>
<td>2. To identify gaps in the current development pathway which could be affecting our talent development system and elite athlete performance</td>
<td>7. To foster awareness, education and planning for parents</td>
</tr>
<tr>
<td>3. To form a framework in which to incorporate solutions</td>
<td>8. To improve communication at all levels of participation and development</td>
</tr>
<tr>
<td>4. To create a change agent which will facilitate planning, training, competition and recovery programs for developing youth during the growth, development and maturation process</td>
<td>9. To assist athletes in developing a winning mentality</td>
</tr>
<tr>
<td>5. To produce a streamlined, efficient system across Canada</td>
<td>10. To promote lifelong enjoyment in table tennis</td>
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</table>
KEY FACTORS INFLUENCING LTP/AD

The following factors are the foundations on which the LTP/AD of a Canadian table tennis player is built.

KEY FACTOR No. 1 ....................................................
The 15-Year Road

Scientific research has shown that it takes a minimum of 10 years and 10 000 hours of training for a talented team of athletes to reach the high level. Considering both the high technicality and match experience it takes to compete on the international table tennis circuit, it will take a minimum of 15 years to develop a team able to reach the podium at major events such as the World Championships or the Olympic Games. This statement applies specifically to Canada, where the athletes are combining school and sport during their junior years.

Of course, the 10 to 15 years of training must be effective and take advantage of sensitive periods of athlete development. There are no shortcuts. Athlete development is a long term process. Short term performance goals must never be allowed to undermine long term athlete development.

KEY FACTOR No. 2 ....................................................
The Fundamentals

Fundamental movements + motor skills + fundamental sports skills = physical literacy. Physical literacy refers to competency in movement and sports skills.

Physical literacy should be developed before the onset of the adolescent growth spurt. With these basic movement skills, a child will be able to improve quickly in any competitive sport. Once these skills are integrated, it is essential for young table tennis players, at the early stages of their development, to participate in other sports such as tennis, squash, racquetball, fencing (or other duel sports). These sports will help to develop the motor skills needed in table tennis: agility, balance, hand-eye coordination, precision, speed, etc.

Table 1: lists the wide variety of fundamental movements and skills that underpin physical literacy. They include four different environments: earth, water, air and ice.

<table>
<thead>
<tr>
<th>Travelling Skills</th>
<th>Object Control Skills</th>
<th>Balance Movements</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Boosting</td>
<td>• Sending:</td>
<td>• Balancing/Centering</td>
</tr>
<tr>
<td>• Climbing</td>
<td>• Kicking</td>
<td>• Body Rolling</td>
</tr>
<tr>
<td>• Eggbeater</td>
<td>• Purting</td>
<td>• Dodging</td>
</tr>
<tr>
<td>• Galloping</td>
<td>• Rolling(ball)</td>
<td>• Eggbeater</td>
</tr>
<tr>
<td>• Girding</td>
<td>• Strike (ball, puck, ring)</td>
<td>• Floating</td>
</tr>
<tr>
<td>• Hopping</td>
<td>• Throwing</td>
<td>• Landung</td>
</tr>
<tr>
<td>• Ice Picking</td>
<td>• Receiving:</td>
<td>• Ready Position</td>
</tr>
<tr>
<td>• Jumping</td>
<td>• Catching</td>
<td>• Sinking/Falling</td>
</tr>
<tr>
<td>• Leaping</td>
<td>• Stopping</td>
<td>• Spinning</td>
</tr>
<tr>
<td>• Poling</td>
<td>• Trapping</td>
<td>• Stopping</td>
</tr>
<tr>
<td>• Running</td>
<td>• Travelling with:</td>
<td>• Stretching/Curling</td>
</tr>
<tr>
<td>• Sculling</td>
<td>• Dribbling (feet)</td>
<td>• Swimming</td>
</tr>
<tr>
<td>• Skating</td>
<td>• Dribbling (hands)</td>
<td>• Twisting/Turning</td>
</tr>
<tr>
<td>• Skipping</td>
<td>• Dribbling (stick)</td>
<td></td>
</tr>
<tr>
<td>• Sliding</td>
<td>• Receiving &amp; Sending:</td>
<td></td>
</tr>
<tr>
<td>• Swimming</td>
<td>• Striking (bat)</td>
<td></td>
</tr>
<tr>
<td>• Swimming</td>
<td>• Striking stick</td>
<td></td>
</tr>
<tr>
<td>• Wheeling</td>
<td>• Volleying</td>
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</tr>
</tbody>
</table>

Jess 1999, adapted Balyi & Way 2004
Peak Height Velocity (PHV) in girls occurs at about 12 years of age. Usually, the first physical sign of adolescence is breast budding, which occurs slightly after the onset of the growth spurt. Shortly thereafter, pubic hair begins to grow. Menarche, or the onset of menstruation, comes rather late in the growth spurt, occurring after PHV is achieved. The sequence of developmental events may normally occur 2 or more years earlier or later than average.

PHV in boys is more intense than in girls and on average occurs about 2 years later. Growth of the testes, pubic hair and penis are related to the maturation process. Peak Strength Velocity (PSV) comes a year or so after PHV. Thus, there is pronounced late gain in strength characteristics of the male athlete.

The developmental sequence for male athletes may occur 2 or more years earlier or later than average. Early maturing boys may have as much as a 4-year physiological advantage over their late maturing peers. Eventually, the late matures will catch up when they experience their growth spurt.

Currently, most athletic training and competition programs are based on chronological age. However, athletes of the same age between ages 10 and 16 can be 4 to 5 years apart developmentally. Thus, chronological age is a poor guide to segregate adolescents for competitions.

Training age refers to the age where athletes begin planned, regular, serious involvement in training. The tempo of a child’s growth has significant implications for athletic training because children who mature at an early age have a major advantage during the “Training to Train” stage compared to average or late matures. However, after all athletes have gone through their growth spurt, it is often later matures who have greater potential to become top athletes provided they experience quality coaching throughout that period.

Trainability is the responsiveness (adaptation) to a training stimulus at different stages of growth and maturation. All physiological systems are always trainable, but there are sensitive periods in development when the body is more responsive to specific training. Coaches must be aware and make best use of these sensitive periods of trainability when planning programs.

The generic LTAG model identifies five physiological factors as a cornerstone for training and performance. They are referred to as the 5 S’s of training and performance: Strength, Skill, Speed, Stamina and Suppleness.
Rate of Growth

Girls & Boys
Physical, Mental - Cognitive, Emotional Development

Developmental Age

Figure 4 illustrates the windows of optimal trainability for females and males. Two windows — stamina and strength — are based on the moving scales of the onset of the growth spurt and PHV. The other 3 windows — speed, skill and suppleness — are based on chronological age.

KEY FACTOR No. 6
Physical, Mental, Cognitive & Emotional Development

Annual training plans take into account the physical, mental, cognitive and emotional development of each athlete. For a complete overview of all these development characteristics, and their implications for the coach, refer to Appendix 1.

A major objective of LTAD is a holistic approach to athlete development. This includes emphasis on ethics, fair play and character building throughout the stages of the 8 pillars. Table Tennis Canada’s LTADM adopts a holistic approach with the intention of helping produce good athletes and good people. As such, the model incorporates mental, cognitive, and emotional developmental components in each stage of development. By considering aspects beyond physical and athletic development we hope to equip our participants with skills both specific to sport and life in general. The development of the person and the athlete should be the goal of every athlete development program/process.

10,000 HOURS TO EXCELLENCE
Periodization organizes and manipulates the aspects of modality, volume, intensity and frequency of training to achieve peak performances when required. Depending on the goals and priorities, the coach will choose to design a plan for one peak performance a year (single periodization), two a year (double periodization) or more (multiple periodization).

The “art and science” of planning the horizontal and vertical integration of training and performance is presented in Figure 5 below. The horizontal arrows represent the progress of an athlete that is quantifiable and based on scientific guidelines; the vertical integration is based on the relationship of each aspect of training and performance.

KEY FACTOR No. 7 ............................
Annual Training, Competition & Recovery Plan

Planning adequately training, competition and recovery is critical for success. In order to reach optimal performance in a competition environment, the training units have to be sequenced in the following manner.

1. Develop the performance capacity of the athlete.
   The performance factors are: sport specific skills, physical components, mental skills, tactical skills.
2. Integrate the performance factors in complex and harmonious blend.
3. Prepare the athlete to perform at identified competitions. What does the coach need to know and take into account in order to design an annual plan?
   • Know how a sport specific athletic form is developed.
   • What the requirements (demands) of the sport are in competition.
   • The competition calendar and the competitions’ relative importance.
   • The developmental age of the participant/athlete and the goal pursued on a short term and long term basis.
   • The actual training state of the athlete at the start of a yearly plan.
   • The contextual reality coach and athlete have to cope with.
   • The general objectives and guiding principles related to the LTAD stage.

Planning adequately training, competition and recovery is the critical blueprint for success. Designing an annual plan means applying the principles of “periodization.” This planning technique provides the framework for arranging complex training processes into a logical and scientifically-based schedule to bring about optimal improvements in performance.

KEY FACTOR No. 8 ............................
Calendar Planning for Competition

Calendar Planning for Competition

Competition is a key element of the table tennis athlete’s progress. As soon as the basic technical skills are acquired, the athlete will evolve through both training and competition.

In the earlier stages of LTAD, the focus in most competitions must be on the integration of new technical elements in matches and the constant improvement of basic tactical and mental abilities. However, it is also important for the athlete to learn how to prepare for an important competition.

Does the actual competition structure and format hinder or favor athlete development? Optimal competition structure at all stages is critical to athlete development. The structure of competition in a sport has implications for selection, talent identification, safety, cost, adolescent periodization tailored to the athlete’s developmental age and their health.

The domestic competitive and event calendar must support and be consistent with LTAD. Different stages of development and different levels of participation have different requirements for the type, frequency and level of competition. At some stages of development, training and development take precedence over competitions and short-term success. At later stages it becomes more important for athletes to experience a variety of competitive situations and to perform well at international and other high level events.

KEY FACTOR No. 9 ............................
System Alignment & Integration

Figure 6 shows the performance priorities that LTAD addresses and the system development it affects. (In this figure, change “training to win” for “learning to win” and “living to win”.) - System Alignment and Integration (Way et. Al 2005)

Stakeholders in a sport include participants/athletes, coaches, officials, parents, administrators, spectators, sponsors and supporting national, provincial and multi-sport organizations. With so many partners, across so vast a country, with different demographic composition, system integration and alignment is a major challenge.

Long-term athlete development is only successful when all parts of the organization work together in a coordinated and integrated way. From the club through to the national level, programs must be athlete-centred/driven and seamless so as to ensure maximum gains for our athletes. The LTAD provides a framework for our organization to ensure the flow of athletes in and/or through the system.

KEY FACTOR No. 10 ............................
Continuous Improvement

As this is the most comprehensive document we have created with respect to long-term athlete development, it is apparent that the long-term implementation and continuous improvement will be critical to its success. Long-term athlete development in general needs to respond and react to changes in the sport at the international level, innovations, and new or changing contextual realities. Such flexibility and adaptability will help ensure the continued successes of our athletes for generations to come.
Active Start
Age: 3-5/6
Mission of the coach
Teach fundamental movement skills and link them with playing in a safe, stimulating and FUN environment.

General objectives targeting the child
• Have fun
• Develop camaraderie
• Learn how to move skillfully

Guiding principles for the coach
• Focus on improving fundamental movement skills such as running, jumping, balancing, twisting, wheeling, kicking, throwing and catching

Specific objectives for the child
• Acquire all basic movement skills building towards more complex movements
• Explore risks and limits in safe environments
• Build confidence and self-esteem
• Get familiar with hand-eye coordination and more specifically with racket games

Fundamentals
Age: 5/6-8
Mission of the coach
Develop fundamental movement skills, build overall motor skills (ABC’s) and teach basic sport specific skills through active participation in a fun and safe environment.

General objectives targeting the child
• Develop basic multi-sport skills involving fundamental movements (running, jumping, balancing, twisting, wheeling, kicking, throwing and catching) in different environments (indoor, in water, in snow, on ice, etc.)
• Introduce motor skills (agility, balance, coordination, rhythm, time/ space orientation, speed, dexterity, hand-eye coordination, etc.)
• Acquire and develop basic table tennis skills
• Learn the basic rules of the game and ethics of sports
• Develop focus, self-confidence, and positive attitude
• Try to instill the love of sports through active participation

Guiding principles for the coach
• Teach basic technical strokes (based on biomechanical principles), the correct racket grip
• Appropriate rubbers to spin the ball must be used
• No periodization but well structured programs and practices
• To learn a good technique, repetition in short, entertaining exercises is required
• Limit the information communicated to the participant to what is essential
• Table tennis organized activities once or twice a week at the beginning of this stage and 3-4 times a week at the end of this stage (the child should also participate in other sport activities)
• Encourage training groups over private training (child needs to interact with other kids)
• Competition must be participation oriented (not winning oriented) and age based (not rating based)
• Be clear, concise and adapt the terminology to the age level
• Coaches should be knowledgeable in child development
• Create a fun, safe & joyful environment

Specific objectives for the child
• Execute basic table tennis strokes in simple exercises with consistency
• Learn good body position and basic footwork technique
• Hit the ball from different parts of the table
• Understand how to respond to different spins
• Develop the ability to focus on the task
• Learn to appreciate competition as a learning environment
Learning to Train

Age: 8/9-11/12

Mission of the coach
Develop general physical fitness, teach sound basic technical & tactical skills and develop basic mental qualities

General objectives targeting the participant
- Continue to develop basic multi-sport skills involving fundamental movements
- Develop motor skills (agility, balance, coordination, rhythm, time/space orientation, speed, dexterity, eye-hand coordination, etc.)
- Develop and consolidate all basic technical skills in controlled conditions
  - Develop basic mental skills
  - Develop basic tactical skills
  - Introduce and develop basic practical tactical knowledge
  - Introduce conditioning
  - Introduce ancillary activities (warm-up, hydration, cool-down, stretching, etc.)

Guiding principles for the coach
- Technical and tactical acquisition must come at the beginning of the session (learning requires a rested central nervous system and concentration)
- Only communicate the technical or tactical information the participant needs to know to accomplish the task
- Frequent multi-ball training to consolidate basic techniques
- Exercises with 70% success rate is necessary for learning to occur
- Skill (technique) learning must come under the umbrella of tactics. The participant must have a clear idea of what tactical problem he/she can solve with the skill taught
- 3-4 training sessions a week at the beginning of this stage and 5-6 sessions at the end (1.5 to 2 hours each session) plus other sport activities
- Encourage training groups over private training
- Monitor PHV (peak height velocity) with girls
- Cash in on the windows of optimal train ability: flexibility; speed; endurance
- The young athlete should spend more time training than competing (70%/30%, as an indicator only)
- Introduce single periodization

Specific objectives pursued by the athlete
- Develop all technical strokes in opposition confrontation situations
- Develop efficient footwork technique
- Develop a taste for effort & conditioning
- Develop the capacity to adapt to different situations
- Learn how to focus on the opponent
- Develop a positive attitude
- Start to self-analyze training habits and performances in competition

Training To Compete

Age: 15/16-21/23 (late bloomer)

Mission of the coach
Integrate all performance factors in a complex and harmonious blend in order to perform on a regular basis at identified, major, domestic and international events

General objectives targeting the athlete
- Determine clear goals and identify the path to reach them
- Develop all sport specific physical qualities and continue to develop general physical qualities
- Refine/Maintain/MASTER all technical skills in competition situations. Develop game plans and apply them efficiently
- Develop and improve ideal performance state
- Optimize ancillary activities and develop autonomy
- Refine / maintain sequence of basic sport skills at competition intensity/density (1 sport)

Guiding principles for the coach
- Develop consistency in implementing variants of basic skills and the new skills acquired in a competition environment.
- Increase and improve the athlete's repertoire of skills.
- Increase the success rate of the skills executed in competition.
- Increase the success rate of the basic practical tactical knowledge implemented in competition.
- Develop / Consolidate new practical tactical knowledge tailor made to the strengths of the athlete.
- Improve decision making (individual tactics)
- In an analogous competitive situation, the player should be able to solve the same tactical problem using different ways (skills/techniques).
- Develop general physical conditioning as well as specific physical conditioning.
- Continue to develop fundamental mental skills.
- Develop the performance capacity of the athlete/team and integrate the performance factors (10 5s) to reach a peak performance at a pre-determined time of the year.

Specific objectives pursued by the athlete
- Adapt technique to different spin, speed, placement and trajectory
- Develop an efficient service and return game
- Build strong tactical patterns
- Develop anticipation
- Control the activation level
- Focus on elements you can control

Training To Train

Age: 11/12-15/16

Mission of the coach
Raise the performance capacity of the athlete, prepare her/him to perform at identified competitions and reach a peak performance at the decisive competition(s) of the year.

General objectives targeting the athlete
- Consolidate and refine all basic technical skills in competitive situations
- Increase the athlete's repertoire of skills
- Commit to a style of play
- Consolidate / Refine basic practical tactical knowledge
- Learn how to play against different styles
- Acquire new practical tactical knowledge tailor made to the level of performance of the athlete.
- Develop decision making.
- Introduce game plan.
- Learn how to cope with the challenges of competition
- Develop endurance, strength, speed and suppleness
- Further develop basic mental skills
- Introduce ideal performance state
- Develop ancillary capacities (warm-up, hydration, cool-down, stretching, etc.)

Guiding principles for the coach
- Focus on the quality of training (the player needs to be challenged throughout a training session)
- Frequent multi-ball training to consolidate/stabilize techniques

Specific objectives pursued by the athlete
- Guide the player through his style of play
- 5-6 training sessions a week at the beginning of this stage and 8-10 sessions at the end (2 to 2.5 hours each session)
- Introduce sport medicine and sport sciences (work with specialists such as sports psychologists, nutritionists and physical trainers)
- Encourage training groups over private training
- The skills or tactics have to be consolidated or performed in a state of light to moderate fatigue in order to prepare the athlete adequately to competition.
- When preparing the athlete for competition, the training sessions must mirror the requirements of competition regarding active time and rest time.
- The athlete has to learn to extend to the limit of his/her performance capacity systematically in order to improve.
- The training load should be raised gradually and progressively.
- Be aware of the growth, development and maturation process in boys.
- Monitor PHV (peak height velocity) with girls and boys.
- The ratio training to competition should be around 60%/40% (as an indicator only)
- Coaches should be knowledgeable on growth, development and maturation process
- Apply single or double periodization
Guiding principles for the coach

- Training intensity must always be high to optimal
- A lot of repetition is required to automate technique
- Link technical work to decision making and variations
- Individualize the work accordingly to the style of play
- 8-12 training sessions a week (2 to 3 hours each session). Significantly raise the volume during school vacations.
- Encourage training groups over private training
- Manage and lead an integrated support team (IST) becomes important
- In competition, the athlete should concentrate on the task to do, not the outcome
- Frequent matches where the player can win and lose against opponents of the same gender and age category (cadet, junior or under 21). The choice of competitions must favor athlete development.
- Training intensity must always be high to optimal. Sub-maximal intensity will alter the motor coordination of the athlete
- In training, more time should be spent on random conditions (to mirror competition) than on controlled conditions
- Monitor fatigue / recovery adequately
- Be aware of the factors that influence tactical thinking when the athlete is confronted with a decision making situation: speed of the action taking place; quality of the observation of the athlete; experience and tactical knowledge of the athlete; memory (remembering practical problems solved) and emotional state of the athlete.
- When preparing for a competition, the athlete should focus on exploiting the flaws and deficiencies of the up-coming opponent.
- The athlete must learn to stick to a game plan and not to panic when encountering difficulties
- Apply single, double or multiple periodization tailor made to the athlete’s needs and the competition calendar

Specific objectives pursued by the athlete

- Develop specific physical qualities according to the style of play
- Practice with “in game” philosophy
- Develop a good tactical knowledge about oneself and main opponents
- Adapt quickly to the opponent’s strategies and variations
- Constantly force the opponent to adapt
- Develop visualization abilities
- Introduce and develop ideal performance state
- Learn to relax in stressful situations

Learning To Win

Age: 18/19 (depends on the rate of development)

Mission of the coach

Monitor all aspects of performance in order to help the athlete reach a peak performance in major international events

General objectives targeting the athlete

- Is fully committed to the pursuit of international excellence
- Develops an efficient personalized approach to performance
- Has good consistent international performances
- Raises the level of her/his game in decisive moments
- Explores aspects related to the post-sport career

Guiding principles for the coach

- Understand the path the podium: early senior years are difficult for a young player
- Integrate performance factors to meet the up-coming competition requirements
- Organize training in mostly random conditions

Specific objectives pursued by athlete

- Employ video analysis as an important part of success (especially in competition)
- Ensure personalized work with the best sport science specialists
- Lead 10-12 training sessions/week (2-3 hours each session) and regular training camps.
- Manage all demands related to the athlete’s career (accommodation, support staff, sponsors, media, etc.)
- Model all possible aspects of training and performance.
- The training structure of high performance athletes is a mirror image of the coordinated and goal adapted method. Because of the international competition calendar, training is punctual and temporarily focused on special preparation for major events.
- In training, more time should be spent on random conditions (mirror competition requirements) than on controlled conditions (block learning).
- Monitor fatigue / recovery adequately.
- Frequent preventive breaks permitting recovery to avoid overtraining and injuries.
- Coaches have to be more effective in managing and leading an integrated support team (IST)
Active for Life

The athlete enters this stage at the point of withdrawal from high-level competitive table tennis. When it occurs, two options are offered:

1. Keep training to stay physically healthy:
   • Practice table tennis for fun
   • Play in regular league competition
   • Keep competing at Master's level in table tennis or in another sport

2. Stay involved in table tennis:
   • Move to sport-related careers (coaching, administration, officiating, small business enterprises, media, etc.)
   • Become a volunteer (board member, mentor, etc.)

Main Philosophy for Players Remaining in the Organized Table Tennis Training Structure:

Mission of the coach: Facilitate lifelong participation in sport for the pleasure and wellness derive
PODIUM BOUND: The Future of Canadian Table Tennis! The Pursuit of the Excellence Stream

GOAL
Build a team of fully motivated athletes that will compete for the podium at the Olympic Games in 2016 and beyond.

REACHING OUR GOAL
To reach our goal athletes and the sport/table tennis system must continually improve and answer the challenges they face. Athletes must have a clear vision and full commitment to reach the top; coaches must fully engage in the ‘Athlete Pathway’ (see appendix A) to guide athletes to the high international level; the volunteer leadership and staff must support the Goal 100%.

BASIC STEPS TO REACH OUR GOAL

A - FOCUS ON OUR STRENGTHS:
Canada receives much ‘free’ table tennis expertise through immigration from different parts of the world. We must provide room for this expertise in our competition, training and coaching systems; maximize the ‘capital’; the make-up of Canadian society is an excellent basis for a truly international sport like table tennis.

We should strive to continually strengthen the Canadian competition system through:
• increased provincial and regional competitions

(tournaments, leagues)
• building on the hosting of international competitions to provide inexpensive opportunities for Canadian athletes in Canada.
• building on training center partnerships: China, Europe
• building on training/competition exchanges.

B - IMPROVE OUR WEAKNESSES:
Geography and financial resources are our biggest weakness.

We must continue to:
• find ‘short-distance solutions’ for developing athletes: regional championships, training camps, leagues.
• improve sponsorship revenue, fund-raising revenue.
• exhaust funding programs through Sport Canada, Podium, CDC, provincial programs, etc.
• develop and clearly outline a high-performance path (clubs/centers of excellence, the National Training Center inc international exchanges).
• seek buy-in from athletes, coaches and parents.

Our success must be built on a strong foundation which includes:
Athletes, Coaches, Leadership, Competition, Training, Facilities, Sport Science, and Parents. Without an integrated approach which this model applies to the development of Table Tennis, our sport will not reach our goals for 2016.

ANALYSIS OF THE CURRENT TABLE TENNIS ENVIRONMENT

<table>
<thead>
<tr>
<th>BUILDING BLOCKS</th>
<th>CURRENT ISSUES</th>
<th>SOLUTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athletes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small pool of U10s</td>
<td>Strengthen the TOPS School Program on the elementary school level. Provincial buy-in: that 75% of new school development will be on the elementary school level. Establish provincial championship at the elementary school level.</td>
<td></td>
</tr>
<tr>
<td>Early age LTAD implementation</td>
<td>Focus on Active Start, Fundamentals and Learning To Train stages, Institute sport school programs at the beginning of Learning To Train stage.</td>
<td></td>
</tr>
<tr>
<td>Competition preparation/ experience for junior athletes</td>
<td>Make full use of domestic competition structures; develop Canadian model of competition planning (with realistic financial planning); continue hosting policy matches to LTAD model</td>
<td></td>
</tr>
<tr>
<td>Coaches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High level focus</td>
<td>Work with employers to set clear goals for coaches and athletes;</td>
<td></td>
</tr>
<tr>
<td>Focus on results</td>
<td>Synchronize ‘international benchmarking’ with regional and provincial centers</td>
<td></td>
</tr>
<tr>
<td>Working conditions</td>
<td>Set high grade, salary bonuses for ‘team improvement’</td>
<td></td>
</tr>
<tr>
<td>Development coaching</td>
<td>Clear job description with median industry standard remuneration.</td>
<td></td>
</tr>
<tr>
<td>Coaching development</td>
<td>Transform ‘private’ coaching into group coaching; support coaches in non-coaching tasks with staff.</td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technique</td>
<td>Focus on ‘clean technique’, make better use of ‘technique experts’ (e.g., Chinese trained coaches)</td>
<td></td>
</tr>
<tr>
<td>Focus on physical training</td>
<td>Develop and apply physical standard testing as basic condition for acceptance into the National Team</td>
<td></td>
</tr>
</tbody>
</table>
**Implementation of LTP/AD Model**

To implement the LTP/AD model, changes that affect all levels may have to be made: funding, infrastructure, planning, staffing, coaching education, competition structure, governance. Successful implementation will require strong partnerships between Table Tennis Canada and the provinces/territories, founded on a common vision, strong leadership and an effective communication plan. The provinces must develop similar partnerships with their stakeholders.

The implementation process consists of three phases:

**Phase 1:**
- Designing a sport-specific LTP/AD model tailored to our contextual reality. The model seeks to increase participation and will illustrate a pathway leading to the pursuit of international excellence;
- Designing a strategic implementation plan.

**Phase 2:**
- Developing details for each stage of the participant/athlete development model, specifying the requirements for each level and outlining the necessary changes that need to be made. This phase involves reviewing the LTP/AD model and ensuring it is appropriate for our context;
- Introducing new initiatives related to one or more of the pillars to be implemented in our model.

**Phase 3:**
- Implementing change;
- Developing annual training, competition and recovery plans for each stage, particularly during the growth, development and maturation process;
- Evaluating the implementation of LTP/AD.

The LTP/AD plan provides a continually improving and evolving framework for Table Tennis Canada to build the most appropriate training and competition structure at each stage of the participant/athlete development. Implementing LTP/AD will take time and will never finish. Patience and a willingness to change the way we do things are essential.
## Appendix 1

### Physical, Mental and Cognitive, and Emotional Development Characteristics

The following Moving Scales provide a guideline on how to utilize the Physical, Mental, Cognitive and Emotional Development Characteristics tables, pointing out the overlaps at the various stages of LTAD.

<table>
<thead>
<tr>
<th>FUNdamentals Learning to Train</th>
<th>Training to Train</th>
<th>Training to Compete</th>
<th>Training to Win</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Childhood</td>
<td>Late Puberty</td>
<td>Early Puberty</td>
<td>Early Adulthood</td>
</tr>
</tbody>
</table>

### Late Childhood - Physical Development

<table>
<thead>
<tr>
<th>Basic characteristics</th>
<th>General impact on performance</th>
<th>Implications for the coach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart size is increasing in relation to rest of body.</td>
<td>Endurance capacity is more than adequate to meet the demands of most activities.</td>
<td>Understand that the child has the capacity to keep going.</td>
</tr>
<tr>
<td>Anaerobic system is not developed.</td>
<td>There is a limited ability to work anaerobically.</td>
<td>Plan short duration anaerobic activities. The ability to hold breath must be practiced and built up gradually.</td>
</tr>
<tr>
<td>A child’s metabolism is less economical than an adult’s.</td>
<td>Children use more oxygen whether it's expressed in absolute values or prorated for body weight.</td>
<td>Do not expect younger children to keep up with older children.</td>
</tr>
<tr>
<td>Large muscle groups are more developed than smaller ones.</td>
<td>The child is skilful in movement requiring the use of the large muscle groups.</td>
<td>Emphasize the development of general motor skills involving the large muscle groups. Then gradually introduce more precise, co-ordinated movements requiring the interaction of smaller muscle groups.</td>
</tr>
</tbody>
</table>

### Late Childhood - Mental and Cognitive Development

<table>
<thead>
<tr>
<th>Basic characteristics</th>
<th>General impact on performance</th>
<th>Implications for the coach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children have a shorter tolerance time for exercise in extreme temperatures.</td>
<td>Children may show symptoms of overheating or hypothermia more quickly.</td>
<td>To acclimatize children will take longer so longer warm-ups may be required. Watch closely for signs of distress caused by extremes of temperature.</td>
</tr>
<tr>
<td>Children subjectively feel able to be active in the heat before physiological adaptation has occurred.</td>
<td>Great improvement in agility, balance, co-ordination, and flexibility occurs towards the end of the stage.</td>
<td>Postpone or restrict exercise in heat or humidity and ensure that plenty of fluids are ingested. Thirst is not a good indicator of fluid need.</td>
</tr>
<tr>
<td>Motor patterns become more refined and the balance mechanism in the inner ear gradually matures.</td>
<td>There is apparent improvement in strength not brought about by the neuro-muscular adaptations of muscle fibres.</td>
<td>Plan coordination activities.</td>
</tr>
</tbody>
</table>

### Late Childhood - Mental and Cognitive Development

<table>
<thead>
<tr>
<th>Basic characteristics</th>
<th>General impact on performance</th>
<th>Implications for the coach</th>
</tr>
</thead>
<tbody>
<tr>
<td>The attention span gradually increases.</td>
<td>Children cannot listen or stay still for long periods.</td>
<td>Provide short and precise instructions. Devise strategies to ensure children are listening. Children learn well by imitating and practicing correctly-modelled movements.</td>
</tr>
<tr>
<td>Children are enthusiastic and often impatient.</td>
<td>Children want to move and not listen.</td>
<td>Do not bombard children with technical information. Give only sufficient detail for the activity to be undertaken. Keep the fun.</td>
</tr>
<tr>
<td>Children have very limited reasoning ability.</td>
<td>Children love to be led.</td>
<td>Direct the training and give it a tight focus with activities that are fun and well planned. Introduce imaginative ways of achieving performance goals.</td>
</tr>
</tbody>
</table>
Late Childhood - Emotional Development

<table>
<thead>
<tr>
<th>Basic characteristics</th>
<th>General impact on performance</th>
<th>Implications for the coach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children enjoy the repetition of activities</td>
<td>Skill learning must be directed; children do not learn correctly just by trial and error.</td>
<td>Provide correct demonstrations of the basic sport skills. Personal demonstrations must be</td>
</tr>
<tr>
<td>and improve through experience.</td>
<td></td>
<td>accurate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children establish their preferred learning</td>
<td>Learning is through verbal, visual, or manual means. Most children are doers!</td>
<td>Use a variety of learning styles to suit individual needs.</td>
</tr>
<tr>
<td>style.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imagination is blossoming.</td>
<td>Creativity should be encouraged.</td>
<td>Allow the children to play and experiment. Use their ideas to create exciting sessions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Structure to encourage individuality and creativity. Sport provides an excellent vehicle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for expression.</td>
</tr>
<tr>
<td>Language skills may be limited but are</td>
<td>Children can't make corrections to their performance unless they understand what is being asked</td>
<td>Use terminology that can be easily understood. Gradually introduce technical terminology.</td>
</tr>
<tr>
<td>improving.</td>
<td>of them.</td>
<td>Children love long words.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Basic characteristics</th>
<th>General impact on performance</th>
<th>Implications for the coach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children like to be the centre of attention.</td>
<td>Develop this characteristic. Plan activities that guarantee success. Always move from simple to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>more complex when teaching a skill movement. Allow children to show their skills.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children are developing their self concept.</td>
<td>Children tend to evaluate their performance as a whole and in terms that may be black and white.</td>
<td>Provide positive reinforcement to build self-esteem. Children are likely to perform the</td>
</tr>
<tr>
<td></td>
<td>(I was brilliant, or, I was useless).</td>
<td>actions again if they are successful and feel good about it. Build on success.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children feel secure with a routine and</td>
<td>Introduce change sensitively and gradually.</td>
<td>Build a structure that is progressive but maintains continuity.</td>
</tr>
<tr>
<td>structure to training.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children feel secure when coaching is constant.</td>
<td>Children like things to be fair.</td>
<td>Set and maintain high levels of expectancy, but be consistent with each child. Do not let</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mood swings or personal situations change coaching behaviours.</td>
</tr>
</tbody>
</table>
Early Adolescence - Emotional Development

Basic characteristics
Physical, mental, and emotional maturity may not develop at the same time.
Tensions may arise between adults and adolescents.
Hormonal activity increases.
Social interaction between males and females becomes important.

General impact on performance
Athletes who look mature may not act it. Confusion or anxiety may arise.
Adolescents need help to cope with their physical and emotional changes.
Athletes may experience mood swings and behaviour may change.
Athletes want to form friendships and it is important to allow time for them to develop positive relationships.

Implications for the coach
Develop communication skills and understanding.
Ensure two-way communication channels are always open. Allow athletes input into the decision making.
Communicate and accept changes, but don't let hormonal changes be an excuse for negative behaviour.
Try to organize social events that allow social interaction.

Late Adolescence - Physical Development

Basic characteristics
Post-menarche height begins to stabilize. Increase in height is about 5%. Stabilization of muscular system also occurs.
Skeletal maturation continues.
By 17, girls have generally reached adult proportions.
Rate of improvement in motor ability declines.

General impact on performance
Muscles have grown to mature size, but increases in muscular strength continue into the 20s.
Connective tissue is strengthening.
Girls proportionately gain more weight during this period.
Rate of improvement in skill development declines.

Implications for the coach
Maximize strength training to bring about overall improvement. Optimize neuromuscular training.
Continue progressive overloading in training.
Optimize aerobic training. Be aware of how to deal with weight gains. Teach athletes how to compete in varied circumstances.
Be aware that the rate of improvement in motor ability will be slower, but improvement will still be made.

Late Adolescence - Mental and Cognitive Development

Basic characteristics
Generally by 16, the brain has reached adult size, but continues to develop neurologically.
Critical thinking becomes more established.
There should be complete understanding and acceptance of the need for rules, regulations, and structures.

General consequences for performance capabilities and limitations
Athletes can understand the technical requirements of their sport.
Athletes can make decisions about their training pathway.
Rules are seen in simplistic terms and must be clear and well defined.

Implications for the coach
Make sure athletes understand why they are doing certain things.
Allow athletes input and reduce the amount of feedback and make athletes think for themselves. Develop awareness of performance by increasing kinaesthetic knowledge.
Always be seen to be fair because adolescents have a strong sense of fairness in making decisions. Make athletes part of the decision-making process.

Late Adolescence - Emotional Development

Basic characteristics
Major decisions about examinations, universities, and employment work have to be made.
Peer group pressure leads to conflicting loyalties.
Self-actualization and self-expression are important.
Interactions with friends of both sexes continue to be a strong priority.

General impact on performance
There are ‘pulls’ on time and energy.
An athlete may give up sport because of peer pressure and the need to be seen as one of the gang.

Implications for the coach
Build in prophylactic breaks. Be aware of external pressures. Seek professional guidance to ensure the correct career and educational pathway.
Be sensitive in goal setting to ensure that common goals are established and met.
Treat athletes as adults. Share goals and work co-operatively towards them. Maintain a coach-led structure.
Allow time to establish independent social interaction.
### Early Adulthood - Physical Development

<table>
<thead>
<tr>
<th>Basic characteristics</th>
<th>General impact on performance</th>
<th>Implications for the coach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiologically, the body reaches maturity during this stage.</td>
<td>All physiological systems are fully trainable.</td>
<td>Ensure that physical training programs employ the most advanced techniques and sport science information to facilitate maximum adaptation and minimize injuries.</td>
</tr>
<tr>
<td>Final skeletal maturation in females occurs at about 19-20 years and in males about 3 years later.</td>
<td>Use state-of-the-art testing and monitoring programs.</td>
<td>Carefully monitor overtraining and overtraining.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Organize regular medical monitoring Schedule additional blood tests for females in case of anemia.</td>
</tr>
</tbody>
</table>

### Early Adulthood - Mental and Cognitive Development

<table>
<thead>
<tr>
<th>Basic characteristics</th>
<th>General impact on performance</th>
<th>Implications for the coach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurologically, the brain matures about 19-20 years of age.</td>
<td>Athletes are capable of self-analyzing and correcting and refining skills. Athletes can analyze and conceptualize all facets of their sport.</td>
<td>Establish winning as the major objective.</td>
</tr>
<tr>
<td>There is a complete understanding and acceptance of the need for rules, regulations, and structure.</td>
<td>Well-developed information processing skills improve the athlete's ability to visualize verbal instructions.</td>
<td>Implement principles of adult learning.</td>
</tr>
<tr>
<td></td>
<td>The young adult must perceive the rules and structure as being clearly defined and fair.</td>
<td>Involve athletes in decision making and planning team or group activities.</td>
</tr>
</tbody>
</table>

### Early Adulthood - Emotional development

<table>
<thead>
<tr>
<th>Basic characteristics</th>
<th>General consequences for performance capabilities and limitations</th>
<th>Implications for the coach</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a need to be self-directed and independent.</td>
<td>Athletes are ready to assume responsibility and accept the consequences of their actions.</td>
<td>Emphasize goal setting to give definite direction and purpose to the athlete's overall program.</td>
</tr>
<tr>
<td>Self-actualization and self-expression are important.</td>
<td>Major changes in interests, hobbies, and physical activities occur.</td>
<td>Treat athletes as adults and with respect. Remember that the coach's direction and structure remain important.</td>
</tr>
<tr>
<td>Major decisions on career, education, and lifestyle are priority at some point in this stage.</td>
<td>Interactions with the opposite sex continue to be a strong priority with lasting relationships developing.</td>
<td>Make professional guidance available, considering off-season and educational pursuits.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide athletes with ample opportunities for independent social interaction.</td>
</tr>
</tbody>
</table>
Appendix 2
Long-Term Athlete Development Plan - Canadian Table Tennis Association

Chronological Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Under</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>3-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>3-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Activity Start

- **Age 3 - 6**
  - FUNdamentals
    - Under 10 - Learning having fun
  - Learning to Train
    - CA11
    - Double Periodization
  - Training to Train
    - CA13
    - Double Periodization

Based on testing and monitoring

TOPS - Phase 1

- Learning Table Tennis having FUNdamentals
- TOPS - Phase 2
- TOPS for Club Program - Phase 1

CTTA Program in partnership with Clubs

- International Competition: Specific Age Circuits
- International Competition: Professional Circuit
- U21
- Multipart Periodization

National High Performance National Center

- Partnership with the Regional High Performance Training Centres - Centre of Excellence and Clubs

Ancillary Capacities

- Warm-up
- Environment
- Cool-down
- Health
- Stretching
- Equipment
- Regeneration
- Mental
- Taper & Peak
- Socio-cultural
- Nutrition - Hydration
  - Integration of sport science and sport medicine, as well as sport specific activities

Basic Components of Training

- Periods
  - Preparation
  - Competition
  - Transition
- Phases
  - General
  - Specific
  - Pre-Competitive
  - Competitive
  - Transition

4:1, 3:1, 2:1
- Meso Cycles
  - 1:1, 1:2
  - 1:2

5:1, 4:1, 2:1
- Micro Cycles
  - 3:1, 2:1

Sessions

<table>
<thead>
<tr>
<th>Sessions</th>
<th>15</th>
<th>12</th>
<th>9</th>
<th>6</th>
<th>4</th>
</tr>
</thead>
</table>

Individual Sessions

- Warm-up
- Main Component (Five Ss)
- Complimentary
- Cool down

Seasonal and Natural Trends

- Active for Life
- Physical, Mental, Cognitive and Emotional Development

10 years to excellence = 10,000 hours

Canadian Table Tennis Association National Team Structure

The Canadian Junior Championships

Regional High Performance Training Centers

Centre of Excellence

National High Performance National Center

(Partnership with the Regional High Performance Training Centres - Centre of Excellence and Clubs)

Optimizing training competition and recovery loads

CTTA Program in partnership with Clubs

International Competition: Specific Age Circuits

International Competitions: Professional Circuit

CTTA Program in partnership with Clubs

International Competition: Professional Circuit

U 21 category
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 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, metal preparation, and taper and peak. The more knowledgeable athletes and coaches 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 anymore, 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 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 2 decades of life.

Development refers to the relationship between growth and maturation with respect to the passage of time. The concept of development also includes the social, emotional, intellectual, and motor realms of the child.

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 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.

Physical literacy refers to the mastering of fundamental motor skills and fundamental sport skills.

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/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. Melina and Bouchard (1995) defined trainability as “the responsiveness of developing individuals at different stages of growth and maturation to the training stimulus.”

REFERENCES


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