

JUDO TRINIDAD AND TOBAGO  
CANADIAN SPORT FOR LIFE  
CARIBBEAN ASSOCIATION OF OLYMPIC COMMITTEES  
TRINIDAD AND TOBAGO OLYMPIC COMMITTEE

PRESENT

# Long Term Athlete Development Framework of Judo in Trinidad and Tobago

---

To Attract and Grow in Sport For Life

Mark Littrean  
23<sup>rd</sup> August 2018



This is a framework of LTAD based on the model from Canadian Sport For Life and adapted for judo in Trinidad and Tobago. It is athlete-centered, coach driven and administration, sport science and sponsor supported. It is inclusive for all and addresses individual challenges and special opportunities in pursuing sport and physical activity.



## JUDO TRINIDAD AND TOBAGO

PO Box 730, Port of Spain, Trinidad  
[president@judott.com](mailto:president@judott.com) , [secretary@judott.com](mailto:secretary@judott.com)  
 Tel: 338-1866, 370-4077, 754-8227

---

### Letter from the President

Judo Trinidad and Tobago is pleased to be a partner in the first group of National Sporting Organizations selected to participate in this Long Term Athlete Development (LTAD) project. This LTAD model has enabled us to learn simple, easy fun exercises with evaluation techniques which contribute to lifelong health and fitness. The introduction of this scientific model to us will enhance poor physical literacy and help address some of the challenges faced in developing top class athletes for Judo. It is important for Trinidad and Tobago to integrate this model into all aspects of training for coaches, athletes and parents. I believe that the LTAD programme is the best and its wide spread use can only redound to the general well being of all persons in our society.

**Wedd Eastman, President**  
**Judo Trinidad and Tobago**  
**Phone: (868) 338-1866**  
**Email: [president@judott.com](mailto:president@judott.com) [weddeastman@ymail.com](mailto:weddeastman@ymail.com)**

### Letter from the Technical Director

Long Term Athlete Development (LTAD) is the most important model for building a foundation of life-long health and wellness in society that I've encountered in my career in judo as an athlete, and now as a coach and administrator. Its scientifically-based and well organized format is easy to follow and relevant to all sports. Judo Trinidad and Tobago (JudoTT) has been using LTAD as its go-to model in its level 1 Instructor Courses, but this project shows that we have just scratched the surface. I'm honoured to have had a hand in developing this Resource Manual which puts JudoTT in a position to better serve its membership and, in extension, T&T Society.

**Mark A. Littrean, Technical Director**  
**Judo Trinidad and Tobago**  
**Phone: (868) 683-9343**  
**Email: [gpjudo@hotmail.com](mailto:gpjudo@hotmail.com)**

---

*President: Wedd Eastman    Secretary: Gerard Hart    Treasurer: Derek Hinds*

**AFFILIATED TO: International Judo Federation, Pan American Judo Confederation, Caribbean Judo Confederation, Ministry of Sport, Trinidad and Tobago Olympic Committee, Trinidad & Tobago Paralympic Committee**

## Table of Contents

	<u>Page</u>
Glossary_____	3-4
Executive Summary_____	5-6
Shortcomings and Consequences_____	7
Where are we now?_____	8-9
Where do we want to be?_____	9-10
How are we going to get there?_____	10
The 10 Key Factors of Influencing Long Term Athlete Development_____	10-27
<b>Key Factor 1. Physical Literacy</b> _____	10-12
Table 1: Fundamental Movement Skill that Underpin Physical Literacy_____	10
Figure 1: Fundamental Movement Skills and Fundamental Sports Skills_____	12
<b>Key Factor 2. Specialization</b> _____	12-13
<b>Key Factor 3. Developmental Age</b> _____	13-16
Figure 2: Maturation in Girls and Boys_____	14
Figure 3: Maturity Events in Girls_____	15
Figure 4: Maturity Events in Boys_____	16
<b>Key Factor 4. Sensitive Periods</b> _____	16-21
Figure 5: Variation in Trainability_____	17
Figure 6: Sensitive Periods for Females and Males_____	18
The Ten S's of Training and Performance_____	18-21
<b>Key Factor 5. Mental, Cognitive and Emotional Development</b> _____	21-23
Figure 7: The Relationships among LTAD Stages and Stages of Physical, Intellectual and Emotional Development_____	22
<b>Key Factor 6. Periodization</b> _____	23-25
Figure 8: Periods and Phases of a Periodized Annual Plan_____	24
<b>Key Factor 7: Competition</b> _____	25-26
<b>Key Factor 8. Excellence Takes Time</b> _____	26
<b>Key Factor 9. System Alignment and Integration</b> _____	26-27
Figure 9: System Alignment, LTAD T&T_____	27
<b>Key Factor 10. Continuous Improvement (Kaizen)</b> _____	27
Stages of LTAD based on Judo Canada Long Term Athlete Development Model_____	28-37
<b>1. Active Start (under 7)</b> _____	28-29
<b>2. FUNdamentals (under 9)</b> _____	29
<b>3. Learn to Train (under 11 &amp; under 13)</b> _____	30-31
<b>4. Train to Train (under 15)</b> _____	31-32
<b>5. Train to Compete (females under 23, males under 25)</b> _____	33-34
<b>6. Train to Win (females 23+, males 25+)</b> _____	34-35
<b>7. Active for Life (13+)</b> _____	35-37
New Participants_____	35-36
Existing Recreational Participants_____	36-37
Former High Performance Participants_____	37
Summary_____	37-38
Resources_____	38-40
Selected Bibliography_____	40-44

## Glossary

**Active for Life** is a movement within the Sport for Life framework in which Canadians become active for life by developing physical literacy. Along with physical literacy and sport excellence, Active for Life is one of CS4L's three key outcomes. This stage can be entered at any age (after the onset of the growth spurt), beginning with developing physical literacy in infancy, and evolves to being Competitive for Life, Fit for Life and/or Sport and Physical Activity Leaders through all phases of adulthood.

- **Competitive for Life**, within Active for Life, is the final LTAD stage of CS4L, where Canadians are active for life through participation in competitive sport
- **Fit for Life**, within Active for Life, is the final LTAD stage of CS4L, where Canadians are active for life through participation in recreational physical activity
- **Sport and Physical Activity Leaders**, within Active for Life, is the final LTAD stage of CS4L, where Canadians contribute to the sport and physical activity experience as professional or volunteer administrators, coaches, instructors, or officials, or through sport science and medicine

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

**Adolescence** is the period during which most bodily systems become adult, both structurally and functionally. It is a difficult period to define in terms of the time of its onset and termination. 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 height growth reaches a peak (PHV), 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 visible physical changes and terminates with the attainment of fully mature reproductive function.

## Age

- **Chronological age** refers to the number of years and days elapsed since birth. Growth, development and maturation operate in this time framework
- **Relative age** refers to differences in age among children born in the same calendar year.<sup>[1]</sup>
- **Developmental age** refers to the degree of physical, mental, cognitive and emotional maturity. Physical developmental age can be determined by skeletal maturity or bone age after which mental, cognitive and emotional maturity is incorporated
- **Skeletal age** refers to the maturity of the skeleton determined by the degree of ossification of the bone structure. It is a measure 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
- **General training age** refers to the number of years in training in different sports
- **Sport-specific training age** refers to the number of years since an athlete decided to specialize in one particular sport

**Ancillary Capacities** refer to the knowledge and experience base of an athlete and includes warm-up and cool-down procedures, stretching, nutrition, hydration, rest, recovery, restoration, regeneration, mental preparation, and tapering and peaking. The more knowledgeable athletes are about these training and performance factors, the more they can enhance their training and performance levels. When athletes reach their genetic potential and physiologically cannot improve 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 one to five years, and late childhood, which includes elementary school-age children aged six through to the onset of adolescence.

**Development** refers to both biological and behavioural contexts. In terms of the biological, “development refers to the processes of differentiation and specialization of pluripotent embryonic stem cells into different cell types, tissues, organs and functional units” (*Malina et al., 2004, p. 5*). For behavioural, this term “relates to the development of competence in a variety of interrelated domains as the child adjusts to his or her cultural milieu – the amalgam of symbols, values and behaviours that characterize a population” (p. 5). Sensitive periods of development refer to the points in the development of a specific behaviour when experience or training has an optimal effect on development.

**Long-Term Athlete Development** is a multi-stage training, competition and recovery pathway guiding an individual’s experience in sport and physical activity from infancy through all phases of adulthood. LTAD is athlete centred, coach driven and administration, sport science and sponsor supported. Sequential stages in the LTAD pathway provide developmentally appropriate programs for all ages to increase participation and optimize performance. Key to LTAD is a holistic approach that considers mental, cognitive and emotional development in addition to physical development, so each athlete develops as a complete person. Based on CS4L principles, LTAD, in a sport-specific context, promotes system alignment and integration between sport club, provincial/territorial and national sport organizations.

**Peak Height Velocity (PHV)** is the maximum rate of growth in stature during the adolescent growth spurt. The age of maximum velocity of growth is called the age at PHV. The onset of the growth spurt, the fastest rate of growth or PHV and the onset of the menarche are biological markers to identify the sensitive periods of accelerated adaptation to training.

**Physical Literacy** means the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life."

- **For parents:** Individuals are physically literate when they have acquired the skills and confidence to enjoy a variety of sports and physical activities
- **For coach and instructor:** Individuals are physically literate when they demonstrate competence and confidence in fundamental movement skills and foundation sport skills combined with the ability to read their environment and make appropriate decisions. Physical literacy allows individuals to enjoy a variety of sports and physical activities
- **For educators and health practitioners:** Individuals who are physically literate move with competence and confidence in a wide variety of physical activities in multiple environments that benefit the healthy development of the whole person (*PHE Canada definitions, 2007*)

**Puberty** refers to the point at which an individual has matured sexually and is 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 sensitive 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 capacity and power.

**Specialization** refers to athletes limiting participation to a single sport, which they train for and compete in on a year-round basis. There are sports that require either early or late specialization in order for an athlete to succeed.

**Trainability** refers to the genetic endowment of athletes as they respond individually to specific stimuli and adapt to it accordingly. Malina et al. (2004) define trainability as “The response of maximal oxygen uptake and of other phenotypes to training” (Malina, Bouchard, Bar-Or, 2004, p. 392).

## Executive Summary

This resource paper describes a seven-stage framework of LTAD in judo for Trinidad and Tobago. LTAD is a training, competition and recovery program based on developmental age — the maturation level of an individual — rather than chronological age. It is athlete-centered, coach driven and administration, sport science and sponsor supported. The LTAD framework is inclusive, addressing the needs of those individuals with a disability. Persons with physical, sensory and intellectual disabilities confront both individual challenges and special opportunities in pursuing sport and physical activity.

### What is Judo?

Judo is a martial art that originated in Japan in the late 19<sup>th</sup> Century. It can best be described as a type of wrestling that includes throws, pins and submission holds. It has grown to become one of the most widely practiced martial arts in the world and in 1964 was the first to be included in the Olympic Games. Judo Trinidad and Tobago (JudoTT) is the national organization responsible for administering the sport in T&T.

### The Problem

Although it is a popular sport *outside* the English-speaking Caribbean, judo struggles to capture significant participation in T&T. With about 150 active participants in judo in T&T and a population of almost 1.5 million we have 0.01% of people doing an Olympic Sport considered to be the most popular martial art in Europe, practiced in almost every corner of the Earth. Judo has never been one of those sports that attracted the masses by name alone in these former British colonies. Also, it's not an easy sport to set up - you need special mats that cost about TT\$500 per square meter, and uniforms that, on average, cost \$600 each. Lack of participation creates a vicious cycle which starts with virtual invisibility, but even more significantly stifles the possibility of growth when there aren't enough capable people involved in the sport in the first place to help make it more visible. That includes those with the expertise and resources to do the job.

### The Solution

We need optimal participation in judo at the grassroots level - schools and communities, especially among young people 5 to 20 years of age. This would provide the base necessary to make this a viable activity that is both sustainable and relevant to the needs of the people of T&T. To do this requires **education** of 3 groups:

- i. **Instructors.** They are the first line of attack and are the ones that take the message of judo to the public. LTAD provides the framework on which their work is built. This is already being done by facilitating courses and workshops and offering opportunities to gain experience by attending competitions and events abroad. But most important, our instructors are expected to lead by example
- ii. **Administrators.** They are the support mechanism for the work done by instructors and are responsible for charting the course for judo with them nationally. Again, training and experience provide the bulk of this education, such as courses on Good Governance by National Sports Organizations, and expertise gained from the work done as executive committee members of JudoTT
- iii. **The Public.** These are the people that are considered stakeholders or extended clients such as parents who have already bought in to judo but would need more information, such as teachers and sponsors. This also means the *general public* that we engage to get our message out there that support our efforts in communities and on a national and international basis. We do this via media releases, newsletters, demonstrations and social media

### The Benefits

- i. **Ethical Behaviour.** Enshrined in the practice of judo is its Moral Code: Friendship, Sincerity, Honour, Modesty, Respect, Responsibility, Courage and Self-control
- ii. **And as with all sports, other benefits to be derived from practicing judo are to:**
  - build health
  - reduce crime

- foster character and citizenship
- introduce newcomers to a community
- stimulate the local economy
- provide adult mentorship to young people
- teach kids important life lessons
- strengthen community connectedness
- contribute to sustainable and happy environments

All of these things, with the exception of experience gained from JudoTT executive, work cost money. But the benefits far outweigh the costs and will save the country much more money than it would spend in trying to rectify the problems that inaction would lead to. The hope is that from this resource paper and accompanying documents the reader will come to understand and appreciate LTAD, while getting a better grasp of how this will work for judo and its growth in T&T.

## Shortcomings and Consequences

Before LTAD can be implemented successfully, the many shortcomings and subsequent consequences that are impeding the T&T sport system must be reviewed. In general, these shortcomings are universal in nature.

### Shortcomings

What are the shortcomings?

- Developmental athletes over-compete and under-train in many sports.
- Adult training and competition programs are superimposed on young developing athletes.
- Training programs designed for male athletes are superimposed on female athletes.
- Preparation is geared to the short-term outcome – winning – and not to the process of developing the athlete.
- Chronological rather than developmental age is used in training and competition planning.
- Coaches largely neglect the sensitive periods of accelerated adaptation to training.
- Fundamental movement skills and fundamental sports skills are not taught properly.
- The most knowledgeable coaches work at the elite level, while less knowledgeable volunteers often coach at the developmental level where quality, trained coaches are essential for optimum athlete development.
- Parents and our society on the whole are not educated about physical literacy and LTAD.
- The developmental training needs of athletes with a disability are not well understood.
- In most sports, the competition system interferes with athlete development.
- Talent identification, talent development and talent transfer are poorly understood and misused.
- There is no integration between physical education programs in the schools, recreational community programs and elite competitive programs.
- Sports encourage athletes to specialize too early in an attempt to attract and retain participants.

### Consequences

What are the results of these shortcomings?

- Poor movement abilities and athleticism.
- Lack of proper fitness.
- Limited skill development due to under-training.
- Poor habits developed from over-competition focused on winning.
- Female athletes may not reach full potential due to inappropriate programs.
- Children not having fun as they play adult-based programs.
- A lack of systematic development in the next generation of international athletes.
- Athletes pulled in different directions by school, club and provincial teams because of the structure of competition programs.
- Remedial programs, implemented by provincial and national team coaches, to counteract the shortcomings of athlete preparation.
- Fluctuating national performance due to poor understanding of talent development, identification and transfer within a developmental pathway.
- Athletes failing to reach their genetic potential and optimal performance level.
- Failure to reach optimal performance levels in international competitions.

The shortcomings and consequences should be seriously considered by program planner.

## Where are we now?

### Athletes

Strengths	Weaknesses
Frequent podium appearances for national youth athletes at international competitions	Relatively poor performances from athletes at the senior level
Profound love for judo. A big part of their lives	Too reliant on coaches for their development. Take a minimal approach - do only what is required
Growing participation among females	Females are constrained by society's "condemnation" of girls rolling around on judo mats - many don't stay very long

### Coaches

Strengths	Weaknesses
Better trained now more than ever	Most certified coaches live and operate in the PoS area. Only 2 in 18 active instructors are female
Are committed and love what they do	Are not fairly compensated for their effort
Are knowledgeable	Don't communicate regularly among themselves

### Officials

Strengths	Weaknesses
Are committed and love what they do	Are few in number. As a result there is disproportionate workload
Come to serve well-intentioned	Are not properly trained or suited for the posts they hold
Have a good working relationship with others	Roles and responsibilities are not clearly defined. As a result they hesitate or don't act

## Parents

Strengths	Weaknesses
Understand the importance of martial arts	Are not educated enough about judo
Have a wide range of skills to offer	Are often too busy to volunteer to help
Are committed to their kids' wellbeing	Are "too soft" on kids who are spoon-fed

## Facilities

Strengths	Weaknesses
Many are located around the country	Are reluctant to rent to clubs. Expensive
Are large and well ventilated	Not many sprung floors for judo practice
Have most amenities for indoor sports	Don't have mats for judo practice

## Where do we want to be?

### Athletes

We want optimal participation in judo at the grassroots level - schools, communities and clubs with emphasis on young people 6 to 20 years. We want a percentage of 75% of total membership to be at that age group. We want a minimum ratio of 1 female to every 2 males participating in judo. Finally, we want athletes to be aware of all the pathways available to them in judo as a lifelong activity.

### Coaches

We want all instructors / coaches to be trained by and attain certification from the relevant local bodies, such as, but not restricted to, JudoTT and T&T Red Cross. For every 7 judoka we hope to have 1 properly trained coach. We want our coaches to take a more proactive approach to leadership seeing themselves as role models and influencers of behaviour vital for the physical and moral foundations of our young and old citizens. Finally, we want our coaches to be fairly compensated for their work.

### Officials

We want our officials to be trained and prepared for the work they undertake. That work constitutes a portfolio which is owned by each official and capably supported by others on the team of officials. We want them to fully appreciate the importance of volunteerism. Finally, we want our officials to understand that their job is to serve the people that practice judo.

### Parents

We want our parents to be educated about the importance of physical literacy in the lives of their children. Furthermore, we must play an active role in educating them about the importance of nutrition, hydration, sleep and a healthy lifestyle. We want our parents to understand the significant impact that judo can make in

not just the obvious physical sense but also the spiritual wellness of those that practice it, especially when it comes to respect, discipline and awareness of self, others and their environment.

## **Facilities**

We want the managers of government owned facilities to be fairer in the allocation of time and space to all national sports organizations wishing to use these locations and prepared to offer alternatives. They must encourage use of facilities by clubs and for them to be affordable for clubs to keep regular practice. We want sufficient facilities to be equipped with multipurpose mats that can be used for judo and other sports. Sprung floors would be an asset if mats aren't designed for concrete or tiled surfaces.

## **How are we going to get there?**

Our number 1 priority is to broaden the base of participants nationally. This base will be strong enough to ensure sustainability and adaptability of judo in the future. This will be done in 3 bold but attainable phases:

**Phase 1 - Expand the current system of judo in schools as an extra-curricular activity\***

**Phase 2 - Introduce judo to rural areas and communities in Trinidad AND in Tobago**

**Phase 3 - The development of judo on islands of the English-speaking Caribbean**

\*This phase has already been successfully completed for the 2015/2016 school year with 10 schools formally inducted into the Schools Judo League (SJL) which began in September 2015. As a result of this successful implementation of Phase 1, another club in South Trinidad is formalizing judo as an extra-curricular at a nearby secondary school and it will soon join the SJL in September 2016. More are expected to follow.

For a more comprehensive look at the plan please refer to the document **Judo Development Program for Trinidad and Tobago and the Lesser Antilles 2015-2020 (Part 1), Mark Littrean, 2015.**

## **The 10 Key Factors Influencing Long-Term Athlete Development**

The following factors are the key components upon which LTAD is built.

### **Key Factor 1. Physical Literacy**

Physical literacy is the cornerstone of both participation and excellence in physical activity and sport. Individuals who are physically literate are more likely to be active for life.

#### **Physically literate individuals:**

- Demonstrate a wide variety of basic human movements, fundamental movement skills and fundamental sports skills.
- Move with poise, confidence, competence and creativity in different physical environments (on the ground, both indoor and outdoor; in the air; in and on water; on snow and ice).
- Develop the motivation and ability to understand, communicate, apply and analyze different forms of movement.
- Make choices that engage them in physical activity, recreation or sport activities that enhance their physical and psychological wellness, and permit them to pursue sport excellence commensurate with their ability and motivation.

**Table 1: Fundamental Movement Skills that Underpin Physical Literacy**

The list is not exhaustive but gives a good idea of the major movement skills across the three skill groups and four physical environments.

LOCOMOTOR SKILLS	OBJECT CONTROL SKILLS	BALANCE MOVEMENTS
<ul style="list-style-type: none"> <li>• Boosting</li> <li>• Climbing</li> <li>• Eggbeater</li> <li>• Galloping</li> <li>• Gliding</li> <li>• Hopping</li> <li>• Jumping</li> <li>• Leaping</li> <li>• Poling</li> <li>• Running</li> <li>• Sculling</li> <li>• Skating</li> <li>• Skipping</li> <li>• Sliding</li> <li>• Swimming</li> <li>• Swinging</li> <li>• Wheeling</li> </ul>	<p><b>Sending:</b></p> <ul style="list-style-type: none"> <li>• Kicking</li> <li>• Punting</li> <li>• Rolling (ball)</li> <li>• Striking (ball, puck)</li> </ul> <p>Throwing</p> <p><b>Receiving:</b></p> <ul style="list-style-type: none"> <li>• Catching</li> <li>• Stopping</li> <li>• Trapping</li> </ul> <p><b>Travelling with:</b></p> <ul style="list-style-type: none"> <li>• Dribbling (feet)</li> <li>• Dribbling (hands)</li> <li>• Dribbling (stick)</li> </ul> <p><b>Receiving and Sending:</b></p> <ul style="list-style-type: none"> <li>• Striking (with bat)</li> <li>• Striking (with racquet)</li> <li>• Striking (with stick)</li> <li>• Volleying (with limbs)</li> </ul>	<ul style="list-style-type: none"> <li>• Balancing/centering</li> <li>• Body Rolling</li> <li>• Dodging</li> <li>• Eggbeater</li> <li>• Floating</li> <li>• Landing</li> <li>• Ready position</li> <li>• Sinking/falling</li> <li>• Spinning</li> <li>• Stopping</li> <li>• Stretching/curling</li> <li>• Swinging</li> <li>• Twisting/turning</li> </ul> <p><i>Lists adapted from CS4L-LTAD, 2013)</i></p>

The basic movement skills identified above can be developed through the following four activities. In combination, they provide a base for all other sports.

- **1) Athletics:** run, jump, and throw.
- **2) Gymnastics:** ABCs of athleticism (agility, balance, coordination and speed). Including **3) dance** adds to rhythmic abilities.
- **4) Swimming:** for water safety reasons; for balance in a buoyant environment; and as the foundation for all water-based sports.

Without the basic movement skills, a child will have difficulty participating in any sport. For example, to enjoy baseball, basketball, cricket, football, netball, handball, rugby and softball, the simple skill of catching must be mastered.

Fundamental movement skills and fundamental sports skills should be introduced through fun activities and short games. At the FUNdamentals stage, it is critical to provide many opportunities for children to explore their movement potential in a safe environment.

**Figure 1: Fundamental Movement Skills and Fundamental Sports Skills** (Trinidad & Tobago Olympic Committee, 2017)



It is critical that children with a disability have the opportunity to develop their fundamental movement skills and fundamental sports skills. By doing so, they are more likely to be included in many school-, community- or club-based activities. Failure to do so severely limits their lifelong opportunities for participation in many physical activities and sport. Children with a disability face difficulty gaining the fundamentals because:

- overly protective parents, teachers and coaches shield them from the bumps and bruises of childhood play;
- adapted physical education is not well developed in all school systems;
- some coaches do not welcome children with a disability to their activities because of a lack of knowledge about how to adapt their program and design integrative skills, drills and games. It takes knowledge and creativity to integrate a child with a disability into group activities where fundamental skills are practiced and physical literacy is developed.

## **Key Factor 2. Specialization**

Sports can be classified as either early or late specialization. Well-known early specialization sports include artistic and acrobatic sports such as gymnastics, diving and figure skating. These differ from late specialization sports in that very complex skills are learned before maturation since they cannot be fully mastered if taught after maturation.

Most other sports are late specialization sports; however, all sports should be individually analyzed using international and national normative data to determine whether they are early or late specialization. If physical literacy is acquired before maturation, athletes can select a late specialization sport when they are between the ages of 12 and 15 and have the potential to rise to international stardom in that sport.

Based on sport-specific work done by more than 100 organizations around the world, experts from the sport-specific groups indicated when sport specialization is recommended. This has allowed groupings of sports within early and late specializations.

### **Early Specialization**

- Acrobatic (gymnastics, diving, figure skating)
- Highly kinaesthetic (important to engage in activities that involve snow, water or a horse early on e.g. snowboard, swimming, synchro, equine). Demanding and complex motor skill requirement

### **Late Specialization**

- Early Engagement
- Kinaesthetic (alpine ski, freestyle ski, luge, cross country ski)
- Team (basketball, ice hockey, baseball, rugby, soccer, water polo, field hockey)
- Visual (tennis, badminton, squash, fencing)
- Standard (typical timing of specialization – majority of sports fit into this category)
- Very Late Specialization (cycling, wakeboard)
- Very Late Specialization; Transfer – when the skills developed in one sport allow an athlete to smoothly transition into another sport (rowing, triathlon, volleyball – beach and indoor, bobsleigh)

Specializing early on in a single, late specialization sport contributes to:

- One-sided, sport-specific preparation
- Lack of ABCs, poor basic movements and fundamental sports skills
- Overuse injuries
- Early burnout
- Early retirement from training and competition

Disability sports are typically late specialization sports. It is imperative that children with a congenital disability or early-acquired disability be exposed to the full range of fundamental movement skills and fundamental sports skills before specializing in the sport of their choice. For older athletes who acquire a disability, it is important that they again pass through the stages of Active Start, FUNdamentals and Learn to Train – using the capacities that their disability permits – and be exposed to a variety of sports before specializing in only one sport.

Judo is a late specialization sport. The movements are complex and numerous. To illustrate, there are 124 techniques of judo which include throwing, grappling and striking techniques. Striking techniques are only practiced in some judo kata. In all, they take years to learn and usually a lifetime to master just one.

A good example of judo as a late specialization sport can be found quite recently. A 32-year old became the first person from T&T to qualify in judo for the Olympic Games. He started judo in 2009 at 25, and 7 years later he was 1 of 320 athletes participating in judo at the Olympics out of thousands that attempt to qualify. Prior to doing judo he was on the national swimming and water polo teams as a youth and also did karate and Brazilian Ju-Jitsu. The main point is that he was already a formidable athlete and gained his athletic foundation from those sports which helped him to make it to the highest level of competition judo.

### **Key Factor 3. Developmental Age**

Children of the same chronological age can differ by several years in their level of biological maturation. Growth, development and rate of maturation are the result of a complex interaction of genes, hormones, nutrients and the environments (physical and psychosocial) in which the individual lives. This combination

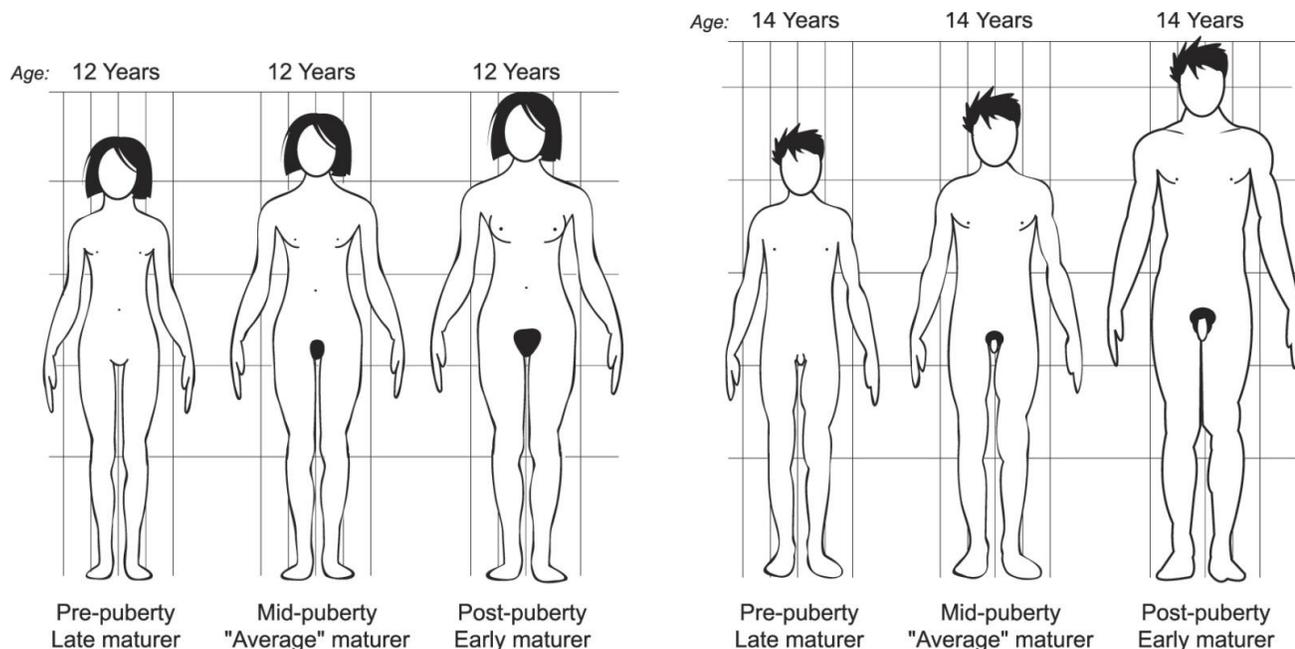
of factors regulates the child's physical growth, neuromuscular development, sexual maturation, mental, cognitive and emotional development, and general physical metamorphosis during the first two decades of life.

Puberty is characterized by numerous physical changes by which a child's body matures into an adult body capable of sexual reproduction. These events occur over a number of years and include major changes to height, deposition of fat, bone and muscle, transformation of the brain, and acquisition of secondary sexual characteristics (e.g. breast, genitalia, pubic and auxiliary hair growth).

The terms "growth" and "maturation" are often used together and sometimes synonymously. However, each refers to specific biological activities.

- **Growth** refers to observable step-by-step changes in quantity and measurable changes in body size such as height, weight, and fat percentage.
- **Maturation** refers to qualitative system changes, both structural and functional, in the body's progress toward maturity such as the change of cartilage to bone in the skeleton.

**Figure 2: Maturation in Girls and Boys** (Adapted from CS4L-LTAD 2013).



Adapted from "Growing Up" by J.M. Tanner. Scientific American 1973

### Age-related terms used in Long-Term Athlete Development:

- **Chronological age** refers to the number of years and days elapsed since birth. Children of the same chronological age can differ by several years in their level of biological maturation.
- **Relative age** refers to differences in chronological age among children born in the same sport program year. For example, a sport may have age-group classification based on age on December 31st of a year, and this can lead to an athlete born in December being almost one year less developed than an athlete born in January.
- **Developmental age** refers to the degree of physical, mental, moral, cognitive and emotional maturity. Physical developmental age can be determined by skeletal maturity or bone age. Mental, moral,

cognitive and emotional maturity are more difficult to determine.

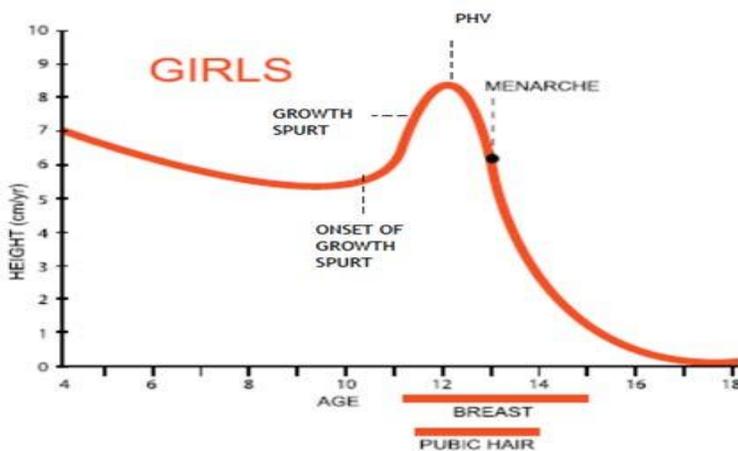
- **Skeletal age** refers to the maturity of the skeleton determined by the degree of ossification of the bone structure. It is a measure that takes into consideration how far given bones have progressed toward maturity, not in size, but with respect to the progressive change from cartilage to bone.
- **Training age** refers to the age where athletes begin planned, regular, serious involvement in training.
- **General training age** refers to the number of years in training in different sports.
- **Sport-specific training age** refers to the number of years an athlete has been training in a particular sport.

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 Train to Train stage compared to average or late maturers. However, after all athletes have gone through their growth spurt, it is often the late maturers who have greater potential to become top athletes provided they experience quality coaching throughout that period.

LTAD requires the identification of early, average and late maturers in order to design appropriate training and competition programs in relation to optimal trainability and readiness. The beginning of the growth spurt and the peak of the growth spurt (Peak Height Velocity) are significant landmarks for LTAD applications of training and competition design.

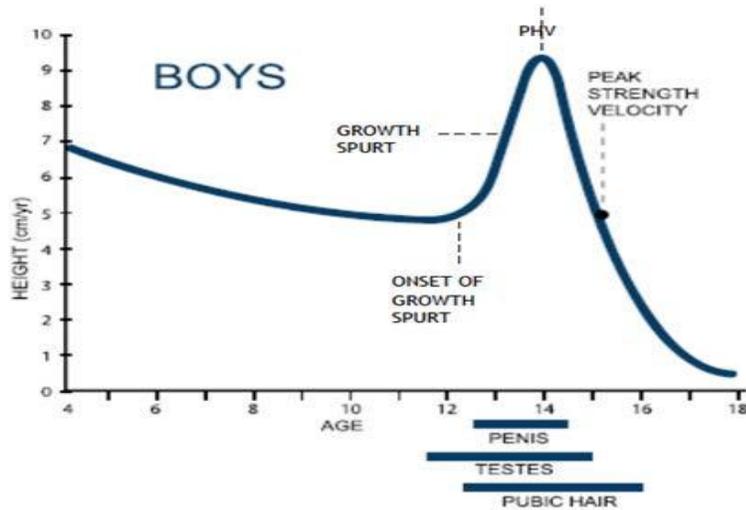
Specific disabilities may dramatically change the timing and sequence of childhood and adolescent development.

**Figure 3: Maturity Events in Girls** (Adapted from CS4L - LTAD 2013)



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, occurs rather late in the growth spurt, after PHV is achieved. Peak Strength Velocity (PSV) comes immediately after PHV, or at the onset of menarche (usually a year after PHV). The sequence of developmental events may normally occur two or even more years earlier or later than average.

**Figure 4: Maturity Events in Boys** (Adapted from CS4L - LTAD 2013)



PHV in boys is more intense than in girls and, on average, occurs about two years later. Growth of the testes, pubic hair and penis are related to the maturation process. PSV comes 12 to 18 months after PHV. Thus, there is pronounced late gain in strength characteristics of the male athlete. As with girls, the developmental sequence for male athletes may occur two or more years earlier or later than average. Early maturing boys may have as much as a four-year physiological advantage over their late-maturing peers. Eventually, the late maturers 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 three to five years apart developmentally (*Borms, 1986*). Thus, chronological age is a poor guide to segregate adolescents for competitions.

Sports need to develop strategies that will encourage late maturing boys to remain in sport until they have caught up developmentally with their early maturing peers, who because of their increased size and strength have a competitive advantage. For girls, there is a need to develop strategies to retain early developers in programs until the competitive disadvantage of wider hips and breast development is reduced as late developers also obtain more adult body shapes.

#### **Key Factor 4. Sensitive Periods.**

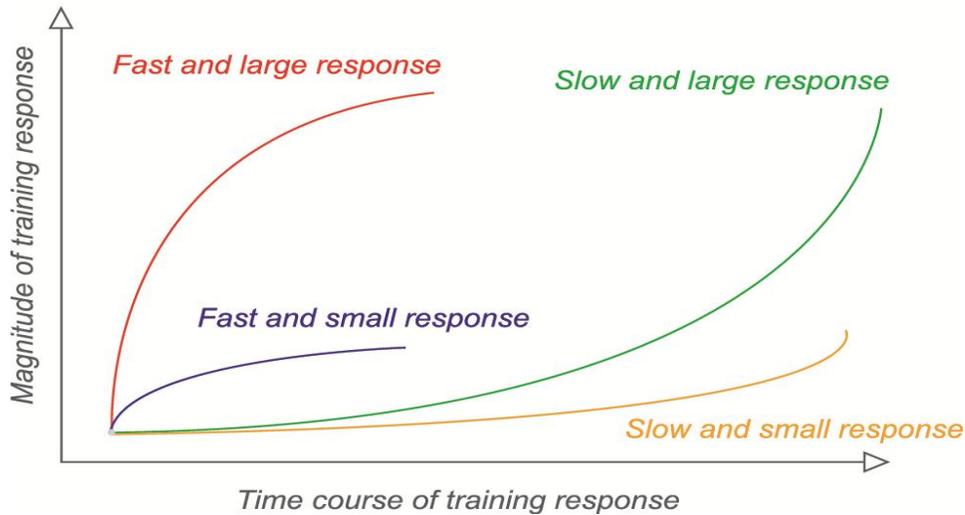
A window of opportunity is when the learning of a specific skill or the development of a specific physical capacity is particularly effective. The entire period of childhood can be viewed as a sensitive period for mastering fundamental movement skills (*Gallahue and Donnelly, 2003*).

Trainability during the sensitive periods of accelerated adaptation to training refers to the body's responsiveness to training stimuli at different stages of growth and maturation. The physiological systems of the athlete can be trained at any age, but there are sensitive periods when individuals are especially responsive to specific types of training.

The sensitive periods of accelerated adaptation to training that occur before adolescence are based on chronological age, while those that occur during or after adolescent growth are based on their relationship to maturational markers (*Balyi, 2001*), such as the onset of the adolescent growth spurt or PHV itself (the peak growth rate after which growth decelerates), and the onset of menarche. Sensitive periods for stamina, strength and skills are identified using maturational markers as well. The trainability of speed and suppleness are based on chronological age (all available research is based on chronological age).

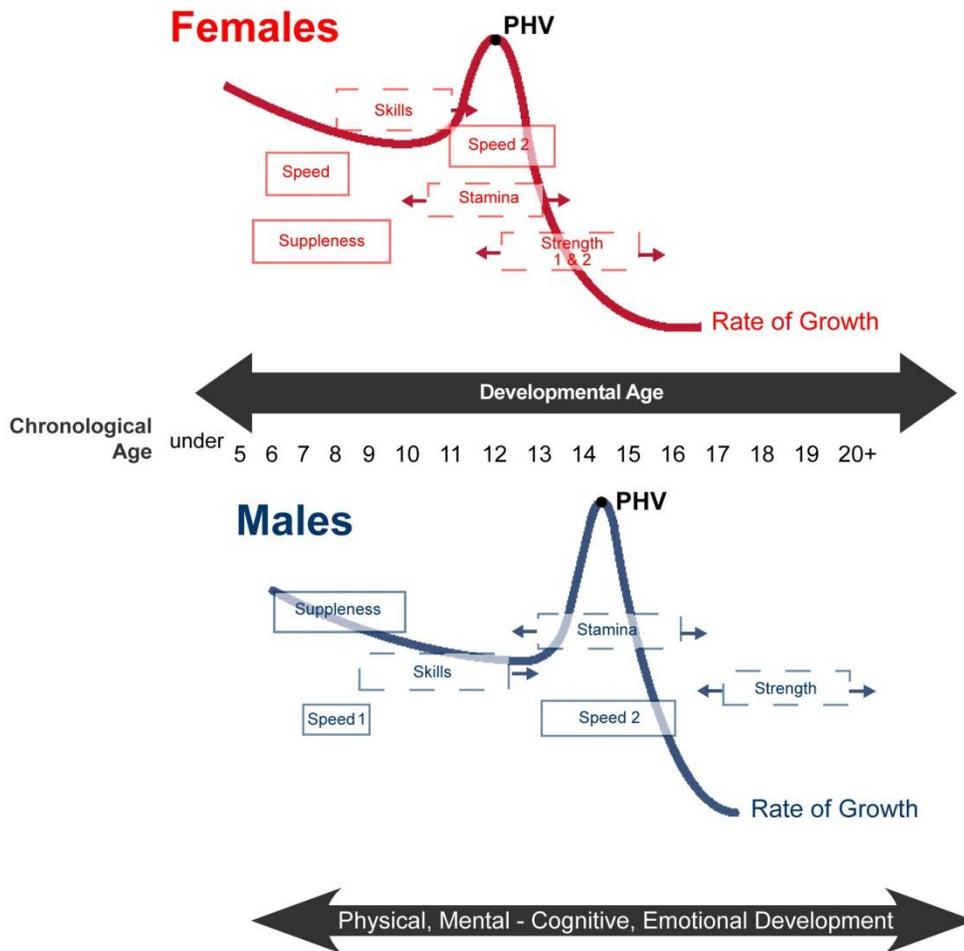
## Variation in trainability.

(Adapted from work by Bouchard et.al., 1997)



**Figure 5:** (Adapted from CS4L - LTAD 2013) illustrates the evidence to date that supports the high degree of variation in the trainability of humans (athletes), both from the standpoint of the magnitude of change and the time course of response to a given stimulus. This probably reflects the elasticity of response to various stimuli and human diversity (as largely dictated by the underlying genetic matrix and supported by the environment in which an individual is immersed). (Norris and Smith, 2002)

**All systems are always trainable!**



**Figure 6: Sensitive Periods for Females and Males** (adapted from CS4L - LTAD 2013). Three sensitive periods – skills, stamina and strength – are based on the moving scales of the onset of the growth spurt and PHV. The other two sensitive periods – speed and suppleness – are based on chronological age, due to the fact that all research on speed and suppleness has been based on chronological age. The trainability of the different systems for children and youth with a disability is not well understood. Applying this information to specific athletes with a disability is a good example of coaching being an art as well as a science.

During the sensitive periods the windows of trainability are fully open. Outside of the sensitive periods the windows are still open, though only partially.

### The Ten S's of Training and Performance

The five basic S's of Training and Performance (*Dick, 2007*), and the roles they play in judo.

1. Stamina (Endurance) 2. Strength 3. Speed 4. Skill 5. Suppleness (Flexibility)

#### 1. Stamina (Endurance)

The sensitive period for stamina occurs at the onset of the adolescent growth spurt. Aerobic capacity training is recommended before athletes reach PHV. Aerobic power should be introduced progressively after PHV when growth rate decelerates. In judo the regulation time period for a match can be up to 5 minutes (not including stoppage and sudden death times, which may get up to 15 minutes). The aerobic energy system in this case ( $\geq 4$ mins) plays an important part in the athlete being able to perform at the latter stages.

## 2. Strength

The sensitive period for strength in girls occurs immediately after PHV or at the onset of menarche, while for boys it is 12 to 18 months after PHV. In judo there is grappling, a form of wrestling that includes being able to move an unwilling opponent in ways to perform techniques that would ensure victory, thus it plays an important role in Judo.

## 3. Speed

For boys, the first sensitive period for speed occurs between the ages of 7 and 9 years, and the second occurs between the ages of 13 and 16. For girls, the first sensitive period for speed occurs between the ages of 6 and 8 years, and the second occurs between the ages of 11 and 13. As with most other combat sports, in judo lineal, lateral and multi-dimensional speed is important. Reaction time is not speed!

## 4. Skill

The sensitive period for optimal skill training generally takes place between the ages of 9 and 12 years for boys and between the ages of 8 and 11 for girls or more precisely before the onset of adolescent growth spurt (the “skill hungry” years). In judo there are 67 throwing techniques and 29 grappling techniques that can be performed in numerous situations. The ability to do these with another opponent who can be just as knowledgeable as you requires a high level of skill to ensure effectiveness and safety.

## 5. Suppleness (Flexibility)

The sensitive period for suppleness for both genders occurs between the ages of 6 and 10. Although flexibility training during puberty yields good results, special attention should be paid to flexibility during the adolescent growth spurt, due to stresses on muscles, ligaments and tendons by the rapidly growing bones. With the wide range of techniques and scenarios they are used in flexibility in judo increases the effectiveness of these techniques in offence and defence. It also reduces the risk of injury.

An additional five S’s have been identified as important to building a complete and holistic plan for developing athletes. These include the following considerations:

## 6. Structure/Stature

Stature is the height of a human. In terms of training and performance, it refers to the process where the instructor, coach, teacher or parent records regular measurements before, during and after maturation. The purpose is to track growth and identify the onset of the adolescent growth spurt, PHV and whether athletes are early, average or late maturing. The tracking of stature as a guide to developmental age allows for planning to address the sensitive periods (*Viru, 1995; Viru et al., 1998; Viru et al., 1999*) of physical development (endurance, strength, speed and flexibility) and skill development. Measurements should be done every three months, measuring standing height, sitting height and arm span.

*(For further information see **The Role of Monitoring Growth in Long-Term Athlete Development – CS4L Resources**).*

## 7. Schooling

In designing an effective training program, the demands of school must be considered. These include integrating school academic loads and duties, school related stresses, and the timing of exams. When possible, training camps and competition tours should complement, not conflict, with the timing of major schools academic events.

Stress should be monitored carefully to ensure that overstress does not occur. (Overstress can occur from the cumulative effects of everyday stresses of life, such as schooling, exams, peer groups, family and romantic relationships, as well as increased training volume and intensities, or competition.) Of particular concern is stress caused by conflicting demands made on athletes from club, school and representative teams. Communication between all coaches involved in the athlete's training and competition programs is essential.

## 8. (p)Psychology – Mental Fitness

Mental fitness concepts and strategies can be introduced to athletes at an early age. Initially, this involves instilling foundational principles of positive attitude, positive focus and imagination, while emphasizing effort and fun. As athletes progress through the seven stages of LTAD, mental skills and strategies are introduced and developed to help athletes handle the increasing pressures and demands of competitive sport. The acquisition of mental fitness is a dynamic process that fluctuates depending on

- the time and effort put towards developing the mental skills and attributes, and
- the athletes' openness to self-learning and reflecting on competitive experiences. In order to provide athletes with the opportunity to reach their personal performance potential, it is imperative that mental fitness be incorporated throughout their long-term development. (*For further information see **Mental Fitness for Long-Term Athlete Development** – CS4L Resources*).

## 9. Sustenance

- Training, participation in sport and physical activity and competition can lead to significant levels of fatigue in athletes. Recovery is the process whereby the body rids itself of fatigue. At the same time, the body adapts to the training stimulus and regains the capacity to produce the strength, endurance and power required for other physical activity, training or competition.
- A variety of methods and modalities can be used to facilitate the recovery process and help the athlete to regain his or her capability to sustain the repeated demands of training, participation or competition. These include nutrition, hydration, rest, sleep and the use of techniques such as massages, contrast baths, ice baths and warm water jets. The need and use of specific recovery strategies, as well as the frequency at which they should be employed, will vary according to the stage of LTAD and the athlete's level of competition.
- Optimal management of the recovery process also requires careful attention be given to the other life activities of the athlete outside of sport. They can also be fairly demanding and represent significant sources of both fatigue and stress.
- Poor planning, excessive training and participation in too many competitions can all induce severe levels of fatigue. The same detrimental outcome can come from the improper management of the athlete's recovery process.
- (*For further information see **Recovery and Regeneration for Long-Term Athlete Development** – CS4L Resources p*).

## 10. Socio-Cultural

The socio-cultural aspects of sport are significant and must be managed with proper planning.

**Socialization via sport** will ensure that general societal values and norms are internalized through sport participation. This occurs at the community level and as an athlete progresses through the LTAD stages, leads to international exposure.

**Sport socialization** refers to the sport subculture in a particular sport. Sport subcultures are very diverse; just consider the differences between rugby, gymnastics, soccer or swimming subcultures. Within each sport subculture, it is important that coaches and parents guard against group dynamics that create a culture of abuse or bullying. Ethics training should be integrated into training and competition plans at all stages of

LTAD.

Overall socio-cultural activity is not a negative distraction or an interference with training or competition activities. It is a positive contribution to development of the participant as a person.

Exposure to various cultures provides broadening of perspectives, including ethnicity awareness and national diversity. Within the travel schedule, recovery can include education related to the competition location, including history, geography, architecture, cuisine, literature, music and visual arts. With proper planning, sport can offer much more than simply commuting between hotel room and competition.

## **Key Factor 5. Mental, Cognitive and Emotional Development**

Mental, cognitive and emotional factors are essential to each athlete's development. Not only is holistic development – which encompasses all of these factors, in addition to physical development – beneficial to the individual, but all of these skill sets are interlinked.

Just as physical and technical skills require long-term and sequential development, so too do the psychological aspects of athlete development. This includes a range of knowledge sets, such as the underpinnings of fair play and ethical sport, mental skills for performance, emotional regulation, sequencing and decision-making.

Programming should be designed to deliver all aspects of athlete development in a complementary manner, including mental, cognitive and emotional components.

Training, competition and recovery programs should consider the cognitive, moral and emotional development of each athlete. This is not simple, since there are no easily visible markers for the transitions between stages of cognitive, moral and emotional development. Figure 11 outlines how Piaget's (1954) stages of intellectual development, and Erikson's (1959, 1964) stages of emotional development match up with the first five stages of LTAD.

**Intellectual development:** children go through both the sensorimotor and pre-operational stages during Active Start. During the first couple of years, children explore the world around them through movement and sensory experience. They begin to understand that objects are permanent by the end of their first year, and by age two they are generally able to plan and execute movements to get what they want, such as moving an object to get an object behind it. Between ages two and seven, children begin to grasp language and develop the ability to talk about things that are not present, though they still maintain a self-centred point of view. Role playing and symbolism, such as a blanket draped over a chair representing a fort, become important at this stage.

The concrete operational stage covers the next three LTAD stages. Moving from FUNDamentals through Learn to Train and into Train to Train, individuals continue to develop logic. They begin to understand how the world operates, though abstractions – game plans or team strategy – can still be difficult to grasp until the early stages of Learn to Train. Comprehension of “reversibility” and the consequences of some actions (i.e. kicking a basketball is a foul and five fouls means dismissal from the game) comes into play during Learn to Train as well.

The formal operational stage takes place during the Train to Train and Train to Compete stages and remains the dominant stage for the remainder of life. The ability to think about abstractions becomes prevalent.

Logical thought and deductive reasoning emerge, and systematic, long-term planning becomes part of the individual's thought process. Individuals fully understand the rules of the game and the consequences of their actions.

**Emotional development:** Individuals go through eight stages of emotional development (so long as they're cared for and raised well), though the first five are most important to coaches or parents engaged in LTAD. Hope, Will and Purpose are all covered by Active Start. Hope is the first year of life when children begin trusting adults. Will is where children learn to explore and begin to develop autonomy, lasting until age three. Between ages four and six – Purpose – children will develop initiative through learning to plan and doing things on their own.

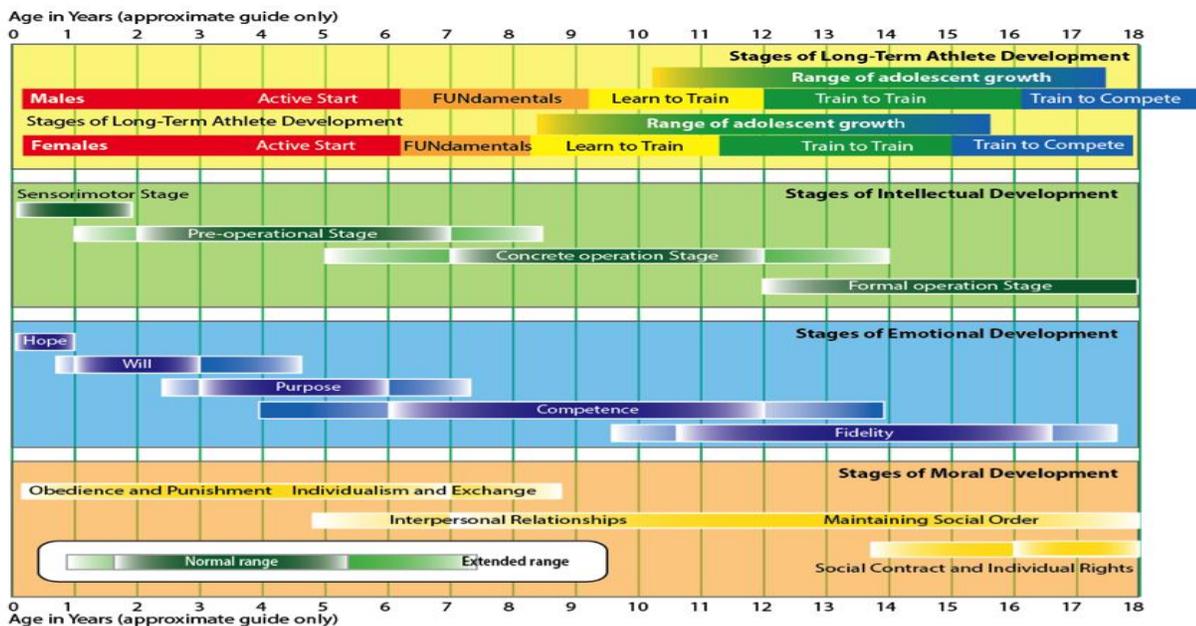
LTAD is about building the entire person, not just the athlete.

Competence spans Active Start to Train to Train. This is where children begin judging and comparing their and others' behaviour. They recognize differences in abilities and if they judge themselves to be inferior to others, they may withdraw from participation. Fidelity ranges from the end of Learn to Train through Train to Compete and encompasses the self-reflection period of one's youth. It's important for children to explore their own world and thoughts without pressure from parents or coaches to be a certain role, which can lead to confusion.

A major objective of LTAD is a holistic approach to athlete 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 athletes' cognitive ability to address these concepts.

**Figure 7: The Relationships among LTAD Stages and Stages of Physical, Intellectual and Emotional Development.**

(Adapted from CS4L - LTAD 2013)



## Key Factor 6. Periodization

Simply put, periodization is time management. As a planning technique, it provides the framework for arranging the complex array of training processes into a logical and scientifically-based schedule to bring about optimal improvements in performance.

Periodization sequences the training components into weeks, days and sessions. Periodization is situation-specific, depending upon priorities and the time available to bring about the required training and competition improvement. In the LTAD context, periodization connects the stage the athlete is in to the requirements of that stage.

The terminology that describes the smaller subsets of time (organized blocks of training or competition) is meso and micro cycles. Meso cycles are usually three to four weeks, while micro cycles are, by convention, usually just seven days.

Periodization organizes and manipulates the aspects of modality, volume, intensity and frequency of training through long-term (multi-year) and short-term (annual) training, competition and recovery programs to achieve peak performances when required.

Single, double, triple and multiple periodization formats follow the same principles with frequently introduced preventative breaks; that is, programmed and prioritized recovery and regeneration elements. Figure 12 illustrates a single periodized annual plan for summer and winter sports.

Periodization, far from being a single fixed process or methodology, is in fact a highly flexible tool. When used appropriately in conjunction with sound methodology and ongoing monitoring and evaluation, it is an essential component in optimal sports programming and athlete development at all levels.

LTAD addresses this requirement by developing periodization models for all stages, taking into consideration the growth, maturation and trainability principles that are unique to the primary development stages — the first two decades of life — yet seamlessly integrate with the subsequent stages of athletic performance and life.

LTAD is typically a 10- to 12-year process that optimizes physical, technical, tactical (including decision making) and mental preparation, as well as the supporting ancillary capacities. Within LTAD is quadrennial planning; this refers to the four-year Olympic and Paralympic cycle for elite athletes, and the annual plan, which is based upon identified periods of athletic preparation, competition and the transition into the next calendar plan.

Current examples of periodization models identified in the sport performance literature are designed for the sub-elite and elite senior/mature performers. There is very little information on periodization for children or adolescents or for athletes with a disability.

The following two charts diagrammatically illustrate a sample annual plan for summer and winter sports respectively. While the same principles apply at each stage, their application will be different at Learn to Train, Train to Train, Train to Compete and Train to Win.

**Figure 8: Periods and Phases of a Periodized Annual Plan** (Adapted from CS4L - LTAD 2013)

PREPARATION PERIOD						COMPETITION PERIOD					TRANSITION
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GENERAL PREPARATION			SPECIFIC PREPARATION			PRE COMP.	COMPETITION				TRANS.
-Goal setting -Strength training -Endurance training -Skill development/correction			-Sport-specific fitness with higher intensity/speed -Refined goal setting (team & individual) -Sports skills refined -Strategy & tactics refined -Competition skills practiced				-Develop mental strategies for competitions -Maintain fitness level -Maintain high level of sports skills -Sharpen competitive skills and tactics -Peaking (personal & team best)				-Rest/rec -Active rest -Reflection/evaluation of past seas -Play other sports to keep fit -Set new goals

**Eight Phases of a Double Periodized Annual Plan**

General Preparation Phase (GPP) 1, Specific Preparation Phase (SPP) 1, Pre-Competition Phase (PCP) 1, Competition Phase (CP) 1, Peak One; Specific Preparation Phase (SPP) 2, Pre-Competition Phase (PCP) 2, Competition Phase (CP) 2, Peak Two; Transition Phase (TP)

### **Eleven Phases of a Triple Periodized Annual Plan**

General Preparation Phase (GPP) 1, Specific Preparation Phase (SPP) 1, Pre-Competition Phase (PCP) 1, Competition Phase (CP) 1, Peak One, Specific Preparation Phase (SPP) 2, Pre-Competition Phase (PCP) 2, Competition Phase (CP) 2, Peak Two, Specific Preparation Phase (SPP) 3, Pre-Competition Phase (PCP) 3, Competition Phase (CP) 3, Peak Three, Transition Phase (TP)

### **Five Phases of a Single Periodized Annual Plan**

General Preparation Phase (GPP), Specific Preparation Phase (SPP), Pre-Competition Phase (PCP), Competition Phase, Peak (CP), Transition Phase (TP)

### **Key Factor 7. Competition**

Optimal competition calendar planning at all stages is critical to athlete development. At certain stages, developing the physical capacities take precedence over competition. At later stages, the ability to compete well becomes the focus.

### **Recommended Ratio, Training to Competition**

Active Start = No specific ratios – all activity based on developing physical literacy and child's passion to play and participate

FUNDamentals = All activities FUN-based including structured play

Learn to Train = 70% training to 30% competition-specific training and competition (non-combat matches)

Train to Train = 60% training to 40% competition-specific training and actual competition

Train to Compete = 40% training to 60% competition-specific training and actual competition

Train to Win = 25% training to 75% competition-specific training and actual competition

Key points to consider:

- Optimal sport-specific competition ratios are required for all stages of LTAD.
- Level and length of the competitive season should be aligned with the changing needs of the developmental athlete progressing through LTAD.
- Over-competition and under-training at the Learn to Train and Train to Train stages result in a lack of basic skills and fitness.
- The appropriate level of competition is critical to technical, tactical and mental development.
- Schedules are often set for team sports by leagues and organizations and not by the coach and athlete, making optimal training based on periodization difficult. For individual sports, individual competition schedules can be selected by the coach and athlete based on the athlete's developmental needs.
- The current competition structure is based on tradition. It should be planned to enhance optimal training and performance of the athlete depending upon their LTAD stage.
- Competitions in T&T must be created and scheduled strategically, with due regard for the optimal performance of an athlete and their tapering and peaking requirements.
- Optimal training-to-competition ratios for individual sports vary greatly and must be determined on a sport-specific basis.

- While international and national calendars are usually well integrated, a systematic sport-specific competition review needs to be undertaken. This is one of the biggest challenges for team sports and a significant challenge for individual sports in LTAD design and implementation.

## **Key Factor 8. Excellence Takes Time**

It has been suggested that a minimum of 10 years of practice (sometimes stated as 10,000 hours) is needed for expert performers in any field to reach the elite level (Ericsson, Charness, Feltovich, & Hoffman, 2006). Other evidence indicates that elite athletes require at least 11 to 13 years of practice to reach levels of excellence (Gibbons, Hill, McConnell, Forster & Moore, 2002). The essential lesson is the same: there are no shortcuts to achieving excellence.

Participant development is a long-term process and elite participants will require approximately a decade or more of practice to achieve international standing. As part of this process, short-term performance goals must never be allowed to undermine long-term athlete development (*Viru, 1995*).

For some sports, the road to excellence is not paved in hours, but through deliberate practice repetitions. Shooting or archery would be measured in number of shots an athlete has taken; golf would be measured in number of swings; in parachuting, an athlete's excellence is related to the number of jumps.

The United States Olympic Committee's The Path to Excellence study (*Gibbons et al., 2002*) provides empirical evidence and a comprehensive view of the development of U.S. Olympians who competed between 1984 and 1998. The results reveal that:

- U.S. Olympians begin their sport participation at the average age of 12.0 for males and 11.5 for females.
- Most U.S. Olympians reported an 11- to 13-year period of talent development from the time they began their sport to when they made an Olympic team.
- U.S. Olympic medallists were younger than non-medallists by 1.3 to 3.6 years during the first five stages of development, suggesting that medallists were receiving motor skill development and training during the skill hungry years.

Lately, the validity of the 10,000 hours has been questioned. It has been suggested that when athletes specialize in certain sports, they can achieve excellence in a much shorter period (*Tucker, 2012*). However, the three or four other sports the athletes participated in before they specialized has usually not been taken into account. LTAD emphasizes a multi-sport approach: all former activities should be included as they are an integral part of the 10,000 hours. Whether it is 10,000 hours, more, or less, excellence always takes time.

## **Key Factor 9. System Alignment and Integration**

Clubs provide an excellent environment for everyone to learn physical education. For example, one of the first things any judoka would learn is how to fall safely using the body in a way that would disperse the energy away from sensitive organs. In addition, one would learn the fundamentals of posture and the dynamics of breaking balance. All of this would probably be done in the first half of an hour of one's first session. Judo would enhance the existing physical education programs at the schools and the schools would recognize this as such. Employment opportunities for instructors can be a derivative of this alliance but it must be recognized or accredited by an institution of higher learning. JudoTT would seek to work in partnership with a local university where a formal structure for physical education in judo can be established. This can be taught at the university where instructors of these clubs would need a diploma/ certification as a

prerequisite to teach judo in schools and in their clubs.

**Figure 9: System Alignment, LTAD T&T** (Trinidad & Tobago Olympic Committee, 2017)



## Key Factor 10. Continuous Improvement

### Kaizen

The LTAD framework is based on the principle of continuous improvement, both in its dynamic evolution and in its application. The concept of continuous improvement is drawn from the respected Japanese industrial philosophy known as Kaizen. This philosophy is part of one of the two fundamental principles of judo:

- **Seiryoku Zenyo** - The Most Efficient Use of Energy

And more specifically

- **Jita Kyoei** - Mutual Help and Prosperity

The latter is harmony, the mutual prosperity by the union of our own strength (synergy). Arising from sincere practice of the first principle, it suggests that the individual's and the group's presence is necessary and beneficial to the progress of everyone.

## Stages of LTAD based on Judo Canada Long Term Athlete Development Model (Judo Canada, 2006) and modified to suit local needs

### 1. Active Start (under 7)



Judo-specific Objectives:

- Basic **ukemi** (break-falls)
- Basic **osaekomi-waza** (pins) as per JudoTT syllabus
- Basic **nage-waza** (throws) as per JudoTT syllabus
- Introduce modified **ne-waza randori** (ground work free practice)

Guiding Principles:

- Body proportions very different from adults, so judo-specific skill must be adapted to accommodate differences
- This is an essential stage for maximal athletic development in later stages
- This stage enhances overall feeling of well-being, confidence and self-esteem
- This stage lays the foundation for development of a strong, healthy body, improved fitness and proper weight control
- Older students may be joining at this stage
- Need for 30-60 minutes per day of organized physical activity
- Opportunities for unstructured “play” time involving physical activity - up to 60 minutes per day

Framework:

- Participation 1-2 times/week; 40-60 minutes each
- Emphasis on **ukemi** and **ne-waza**; time allocation 60-70% **ne-waza**, 30-40% **tachi-waza** (standing)
- Modified **ne-waza randori** in club only
- Motor skills 75%, judo 15%, other (cognitive, mental) 10%; try to twin motor skills with judo where possible
- Focus on basic movement skills and patterns, locomotion (walking, running, jumping, swimming), climbing, throwing, catching, kicking
- include both hand-eye and foot-eye coordination activities
- Progress from simple to more complex movements
- No lifting in **nage-waza**
- Access to developmentally appropriate equipment as needed
- Activities should be designed to ensure success and develop self-esteem and a desire to participate

- Activities should be non-competitive and foster participation
- Maximum grade of white/yellow

## 2. FUNdamentals (under 9)



### Judo-specific Objectives:

- Basic **ukemi** (breakfalls)
- Basic **osaekomi-waza** (pins) as per JudoTT syllabus and escapes
- Basic **nage-waza** (throws) as per JudoTT syllabus
- Introduction to judo etiquette, rules and concept of fair play

### Guiding Principles:

- Emphasis on fun, positive reinforcement and adapting to a structured environment
- Exposure to and development of the ABC's - Agility, Balance, Coordination and Speed
- Games to develop speed, power and endurance
- Introduce modified judo activities
- First "window of trainability" - speed (ages 6-8 girls, ages 7-9 boys)
- Develop speed (linear, lateral, multi-directional for less than 5-6 seconds)
- Further develop flexibility
- Introduce strength exercises using child's own bodyweight, medicine balls, Swiss balls, wheelbarrow
- Introduce power and stamina through games

### Framework:

- Practice 1-2 times per week, maximum 60 minutes each
- Emphasis on **ukemi** and **ne-waza**; time allocation 55-60% **ne-waza**, 40-45% **tachi-waza** (standing)
- Introduction to modified competition 7-8 year-olds in club (non-combat); maximum of 4 per year
- Maximum grade orange

### 3. Learn to Train (under 11 & under 13)



#### Judo-specific Objectives - Part 1 under 11:

- Consolidate previously learned judo skills
- Consolidate **ukemi**
- Learn and develop new judo skills
- Technical development as per JudoTT syllabus
- Acquire and develop new **ne-waza** escapes
- Bilateral development (left and right)
- Introduce mental training (visualization, goal-setting and relaxation)
- Introduce topics for personal development (ethics, social responsibility, general awareness (self/others/the environment))

#### Guiding Principles:

- Sensitive period for skill training in girls is between ages of 8 and 11, boys is between 9 and 12

#### Framework:

- Concentration on the ABC's - agility, balance, coordination and speed
- No Periodization; planning by session and by season only
- 2-3 practices per week; 60-90 minutes each; time allocation 50% **ne-waza**, 50% **tachi-waza**
- Other sports/activities/games to be practiced on a daily basis
- Maximum grade - green

#### Judo-specific Objectives - Part 2 under 13:

- Technical development as per JudoTT syllabus
- Consolidate basic judo technical skills
- Acquire new judo skills
- Emphasize technical perfection
- Develop basic variations of **osaekomi-waza**
- Develop basic variations of **nage-waza** from yellow to green belt
- Pay particular attention to bilateral development
- Introduction to judo history
- Introduction to judo etiquette
- Introduction to modified judo competition

### Guiding Principles:

- Sensitive period of trainability for skills training in girls is between ages 8 and 11 years and between 9 and 12 years for boys - age ranges are PHV dependent
- Strength for females: 2 periods of trainability - immediately after PHV and the onset of menstruation
- Stamina for females: develop at the onset of PHV
- Speed for females: second window of trainability is between 11 and 13 years
- Suppleness for females: special attention during PHV
- No activity on the maximum intensity level
- No long-time continuous training

### Framework:

- Introduce judo concepts through games
- Concentration on the ABC's - agility, balance, coordination and speed
- Depending on athlete's phase of development (i.e. in relation to PHV) begin development of aerobic components, especially in female judoka
- Emphasis on games and general fitness development
- 3-4 practices per week; 60-90 minutes; up to 6 hours judo-specific training per week; time allocation 45-50% **ne-waza**, 50-55% **tachi-waza**
- Increased exposure to formal competition with modified IJF rules (no choking, joint-locking or dropping shoulder throws)
- 4-6 tournaments per year with 4-5 bouts per tournament
- 80-90% technical training; 10-20% tactical training
- Mental training further developed (visualization, goal-setting and relaxation)
- No periodization
- Maximum grade blue

### 4. Train to Train (under 15)



### Judo-specific Objectives:

- Consolidate basic judo-specific skills
- Acquire and develop further techniques and skills as per JudoTT syllabus
- Acquire and develop appropriate tactical and strategic abilities
- Introduction to judo philosophy surrounding winning or losing
- Continue to place emphasis on training, not competition

- Introduce the possibility of pursuing a career in High-Performance Judo
- Emphasize ethical behaviour

#### Guiding Principles:

- Age ranges are PHV dependent
- Strength for males: Sensitive period is 12 to 18 months after PHV
- Stamina for males: best developed at the onset of growth spurt
- Speed for males: 13-15 years, second sensitive period; speed for females: 11-13 years, second sensitive period
- Maintain suppleness; males - special attention during PHV
- Fluctuating emotional development
- Introduce periodization (single)

#### Framework:

- 6-8 tournaments per year with 4-5 bouts per tournament
- Competition at the national level and Caribbean English-speaking tournaments
- Rules as per IJF but with consideration to some techniques deemed “dangerous” at this level (i.e. dropping shoulder throw)
- Refinement of the ABC’s - agility, balance, coordination and speed; general fitness development
- Depending on the athlete’s phase of development (i.e. in relation to PHV) development of aerobic components
- Develop flexibility
- Strength development in the majority of females and in early maturing males
- Bilateral development
- Technical development as per JudoTT syllabus
- 4-5 practices per week; 60-120 minutes each; up to 8 hours judo-specific training per week; 60% tachi-waza and 40% ne-waza; 44 weeks training per year; off-season should be maximum of 4 weeks plus 2 shorter breaks of 2 weeks
- 60% technical training; 40% competition and competition-related training; minimum 100 hours **randori** (free practice or sparring) per year
- Other sports/activities/games to be practiced on a 5-7 times per week basis
- Periodization (single) should be introduced
- Mental training refined (visualization, goal-setting and relaxation)
- maximum grade brown

## 5. Train to Compete (females under 23, males under 25)



### Judo-specific Objectives:

- Consolidate and refine **tokui-waza** (favourite technique) - 4-5 techniques tailored to the individual
- Consolidation/development of under-developed skill sets (gripping, tactics, mat position, transition from **tachi-waza** to **ne-waza**)
- High volume of training, including strength training and endurance
- Development/refinement of all psychological factors leading to Ideal Performance State
- Introduce, develop and refine at least 4 new techniques per year - one each for **tachi-waza** (offence and defence) and **ne-waza** (offence and defence)

### Guiding Principles:

- Individualized training plan
- Double periodization
- Age ranges are PHV dependent
- Refine basic judo skills
- Consolidate new skills learned at the Train to Train stage
- Learning advanced skills
- strength, stamina and speed are always trainable
- For the late maturing athlete see Train to Train (strength and stamina are dependent on the maturation levels of athlete)
- Use testing to determine priorities of the 4's

### Framework:

- 40% general training (includes basic strength training skills, mental training skills, nutrition, warm-up, cool-down)
- 60% competition and competition-specific training; minimum 120 hours (180 hours for under 20) **randori** per year
- Minimum 10 hours per week judo-specific; 60% **tachi-waza**, 40% **ne-waza**
- Judo-specific 5-6 times/week (3-5 times **randori**, 2-4 times technical) 60-120 minutes each
- 45 weeks per year (48 weeks for under 20); off-season should not be more than 3 weeks at a time and

- 2 shorter breaks of 2 weeks each
- **Randori** training 80%+ MHR
- 8 tournaments per year (minimum 10 per year for under 20), minimum 4 bouts each, full IJF rules
- Double periodization
- Individualized training plan - strength training, energy systems development, cross-training to develop weak areas
- Exposure to national and international competition

## 6. Train to Win (females 23+, males 25+)



### Judo-specific Objectives:

- Maximize speed, coordination, agility, stamina and explosive power
- Specialization, specificity and intensity
- Tactics designed to incorporate the individual's strengths and exploit the opponent's weaknesses
- Individualized training to develop a combination of traditional and unorthodox techniques
- Strategies to combat different styles of opponents

### Guiding Principles:

- 4S (strength, speed, stamina, suppleness) always trainable
- All fundamental athletic movement skills important with emphasis on maximizing speed, coordination, agility, stamina and explosive strength

### Framework:

- 75% competition and competition specific training
- 25% of time devoted to ancillary training
- Refinement of **tokui-waza** for all grips, positions and styles
- 65-75% **tachi-waza**, 30-35% **ne-waza**
- **Randori** at 80%+ MHR; minimum 180 hours per year
- 48 weeks of 5-6 sessions per week; off season should be no more than 3 weeks at a time and 2 shorter weeks each of 2 weeks
- Optimal 10 tournaments (40) bouts per year; can be reduced once judoka reaches IPS (Ideal Performance State) and move into maintenance stage of their high-performance career

- Off-mat strength training 1-5 times /week dependent on training phase and individual needs
- Off-mat endurance training 1-3 times/week dependent on training phase and individual needs
- Maintain high volume and increase intensity
- Complementary, but not low risk activities for rest and recovery
- Weight control and nutrition to be perfected
- Multiple periodization as needed

## 7. Active for Life

### New Participants

Guiding Principle:

- Emphasis on making judo fun and enjoyable, attracting new participants of all ages to judo, and fully understanding and satisfying the initial and ongoing motivations and needs of new participants

#### New Participants ages 13-19

- Acquire basic judo techniques
- Acquire judo etiquette and safety
- Instructors must pay particular attention to the process as related to PHV
- Acquire basic skills related to focus, discipline, goal-setting, imagery/visualization
- Create a safe and fun environment where participants feel at ease to practice and learn with others
- Provide opportunities for “quick wins” for participants to generate task-specific confidence, improve self-esteem and feel part of a social group
- Daily activity as per school-based and community-based programs and following LTAD Elite stream
- Judo sessions 2-3 times per week (60-90 minutes each)
- Progression of training tailored to specific learner needs and development objectives

#### New Participants ages 20 and above

- Acquire basic judo techniques
- Acquire judo etiquette and safety
- Certain physical or emotional attributes may need to be considered depending on the new entrant, e.g. desire to be independent or as part of the group and physical limitations of ageing
- Need to consider other challenges associated with ageing process, e.g. limited range of motion, physical handicaps, injuries and longer recovery time needed
- Introducing the stress reducing benefits and emotions management associated with the practice of judo
- Introduce maxims of judo and make linkages to mental discipline, focus and success
- Explain the role of being a good judoka and citizen
- Adjust the content and intensity of judo-specific training and technical development to meet learner needs, e.g. appropriate balance in tachi-waza, ne-waza, self-defence and kata
- Encourage linkages to complement and supplement judo training, e.g. cardiovascular exercises, strength training, stretching and yoga
- Consult appropriate level of expertise for specific advice
- Judo sessions 2-3 times per week (60-90 minutes each) or tailored for specific judo programs and intensity level
- Progression of training tailored to specific learner need and development objective
- Try to focus specifically on adult learners rather than a mix of adults and children

- Develop competition scenarios targeted to learner needs and abilities

## Existing Recreational Participants

### Guiding Principle:

- Emphasis on making judo fun and enjoyable and fully understanding and satisfying the initial and ongoing motivations and needs of existing participants

### Existing Recreational Participants ages 13-19

- Learn new and consolidate previously acquired judo techniques
- Acquire, consolidate and apply judo etiquette and safety rules
- Instructors must pay particular attention to the maturation process as related to PHV
- Continue to create a safe and fun environment where participants feel at ease to practice and learn with others
- Continue to provide opportunities for easily identifiable successes to continue building task-specific confidence, improve self-esteem and feel part of a social group
- Develop skills related to focus, discipline, goal-setting and imagery/visualization
- Judo sessions 2-3 times per week (60-90 minutes each)
- Progression of training tailored to specific learner need and development objectives
- Individual and team competitions
- Encourage development of modified competitions scheduled during dojo hours and/or integrated into practice sessions, e.g. most points accumulated during match, only right side techniques or left, only **te-waza** (hand techniques), **koshi-waza** (hip techniques), **ashi-waza** (leg techniques) or groundwork
- Potential exposure to Level 1 Coaching curriculum by age 18 or 19
- Gradual exposure to judo rules and regulations as technical proficiency and interest increase
- Provide opportunities for learners to practice officiating at club level through **shiai-geiko** (mock contests)
- Encourage active participation assisting in voluntary capacity at club level initially
- Gradual exposure to basic kata techniques in progression and complexity, e.g. **nage-no-kata** (throwing forms) and **katame-no-kata** (grappling forms)

### Existing Recreational Participants ages 20 and above

- Acquire, develop and consolidate basic judo techniques
- Consolidate judo etiquette and safety
- Refine specific learner needs, e.g. general overview of throwing and grappling techniques, self-defence and kata
- Certain physical or emotional attributes may need to be considered depending on the new entrant, e.g. desire to be independent, as part of the group and physical limitations of ageing
- Consolidate basic skills, e.g. stamina, strength, speed, suppleness
- Consolidate judo-specific conditioning and kinaesthetic awareness at the appropriate level. Need to be aware that not all adults may possess the same level of kinaesthetic awareness
- Reinforce the stress-reducing benefits and emotions management associated with the practice of judo
- Continue to emphasize the maxims of judo by making links to mental discipline, focus, success, health and wellness
- Reinforce the role of being a good judoka and citizen
- Develop technical judo skills and consolidate existing judo skills at appropriate level
- Consolidate content and intensity of judo-specific training and technical development to meet learner needs, e.g. appropriate balance of **tachi-waza**, **ne-waza**, self-defence and **kata**

- Judo sessions 2-3 times per week (60-90 minutes each) or tailored for specific judo programs and intensity level
- Progression if training tailored to specific learner need and development objective
- Try to focus specifically on adult learners rather than mix of adults and children
- Be aware of any equipment and training site issues that might need to be addressed, e.g. for ageing learners
- Continue to develop competition scenarios targeted to learner needs and abilities
- Continue to use **randori**-style scenarios
- Gradual exposure to judo rules and regulations as technical proficiency and interest increase
- Provide opportunities for learners to practice officiating at club level through shiai-geiko (mocks contests)
- Gradual exposure to basic kata techniques in progression and complexity, e.g. **nage-no-kata** and **katame-no-kata**
- Refine kata techniques already acquired and increase technical complexity as proficiency and interest increase
- Explore dimension of self-defence and decision-making through study of kata

## Former High-Performance Participants

Guiding Principle:

- Judoka who have ceased to participate in a high-performance judo environment must be faced with a new challenge in order to motivate their continued participation in the sport

### Former High-Performance Participants ages 13-19

- Consolidate judo techniques, e.g. ukemi, tachi-waza, ne-waza, and belt progression as per JudoTT syllabus
- Consolidate judo etiquette and safety
- Instructors must pay particular attention to the maturation process as related to PHV
- Consolidate skills related to focus, discipline, goal-setting and imagery/visualization

## Summary

### Long-Term Athlete Development

- Is a paradigm shift in the way T&T sport is designed and delivered, and gives meaning to the concept of an athlete-centred approach
- Is a philosophy and a vehicle for change
- Is athlete-centered from a child's first involvement in sport to the transition to lifelong physical activity or other sport related activities, and includes development of athletic performance to the highest level of which the individual is capable and to which they desire to aspire
- Integrates the needs of athletes with a disability into the design and delivery of sport programs
- Provides a framework for reviewing current practices, developing new initiatives and standardizing programs
- Establishes a clear development pathway from playground to podium and to being active for life

- Identifies the shortcomings in the T&T sport system and provides guidelines for problem solving
- Provides guidelines for planning for optimal performance at all stages of athlete development.
- Provides key partners with a coordinated structure and plan for change.
- Identifies and engages key stakeholders in delivering quality sport and physical activity programs in sport, recreation, education and health.
- Provides an aligned and integrated framework for delivering systems including partnering with a local university to help build a formal structure for physical education in judo and to help with certification.

### **CS4L.ca/resources**

Balyi, I. & Way, R. (2009). *The role of monitoring growth in long-term athlete development [resource paper]*. Vancouver, Canada: Canadian Sport Centres.

Balyi, I., Way, R., Higgs, C., Norris, S. & Cardinal, C. (2005). *Canadian sport for life: Long-term athlete development [resource paper]*. Vancouver, Canada: Canadian Sport Centres.

Balyi, I., Way, R., Higgs, C., Norris, S. & Cardinal, C. (2005). *Canadian sport for life: Long-term athlete Development [poster]*. Vancouver, Canada: Canadian Sport Centres.

Balyi, I., Way, R., Norris, S., Cardinal, C. & Higgs, C. (2006). *Canadian sport for life: Summary [poster]*. Vancouver, Canada: Canadian Sport Centres.

Balyi, I., Way, R., Norris, S., Cardinal, C. & Higgs, C. (2010). *Canadian sport for life: Developing physical literacy*. Vancouver, Canada: Canadian Sport Centres.

Balyi, I., Way, R., Rosenburg, K., Grove, J. & Robillard, B. (2012). *Canadian sport for life: An introduction to physical literacy*. Vancouver, Canada: Canadian Sport Centres.

Bell-Laroche, D. (2008). *Maximizing the sport experience for our children*. Vancouver, Canada: Canadian Sport Centres. Bell-Laroche, D. (2009). *Linking sport for life with management by values: How values can improve the performance of sport*

*organizations*. Ottawa, Canada: Canadian Sport Centres.

Bhambhani, Y. & Higgs, C. (2007). *Training athletes with a disability*. Vancouver, Canada: Canadian Sport Centres.

Calder, A. (2007). *Recovery and regeneration for long-term athlete development*. Vancouver, Canada: Canadian Sport Centres.

Cardinal, C., Malcolm-O'Grady, C., McMahon, J., Proctor, W. Robertson, S. & Way, R. (2010). *Canadian sport for life implementation guide: Provincial and territorial governments*. Vancouver, Canada: Canadian Sport Centres.

Canadian Sport for Life & Active for Life (2012). *Quality sport checklist: Ask your schools & coaches*. Vancouver, Canada: Canadian Sport Centres.

- CS4L Leadership Team (2011). *Long-term athlete development: Information for parents*. Ottawa, Canada: Coaching Association of Canada.
- CS4L Leadership Team (2012). *Canadian sport for life: CS4L – LTAD 2012 to 2017 five-year activation strategy*. Victoria, Canada: Canadian Sport Institute – Pacific.
- CS4L Leadership Team (2013). *Shaping the ideal NSO: LTAD implementation*. Vancouver, Canada: Canadian Sport Institute.
- Duffy, P. (2007). *Canadian sport for life: Core values*. Leeds, United Kingdom: Sports Coach UK.
- Harber, V. (2007). *The female athlete perspective: Coach/parent/administrator guide*. Vancouver, Canada: Canadian Sport Centres.
- Harris, S. (2006). *Canadian sport for life: Information for parents*. Vancouver, Canada: Canadian Sport Centres.
- Higgs, C., Balyi, I. & Way, R. (2006). *No accidental champions: Long-term athlete development for athletes with a disability [resource paper]*. Vancouver, Canada: Canadian Sport Centres.
- Higgs, C., Balyi, I. & Way, R. (2006). *No accidental champions: Long-term athlete development for athletes with a disability [poster]*. Vancouver, Canada: Canadian Sport Centres.
- Higgs, C., Balyi, I. & Way, R. (2008). *Developing physical literacy: A guide for parents of children ages 0 to 12: A supplement to Canadian sport for life*. Vancouver, Canada: Canadian Sport Centres.
- Higgs, C., Bluehardt, M., Balyi, I., Way, R., Jurbala, P. & Legg, D. (2011). *No accidental champions (2nd edition): Long-term athlete development for athletes with a disability [resource paper]*. Vancouver, Canada: Canadian Sport Centres.
- Higgs, C. & Legg, D. (2011). *Canadian sport for life for athletes with a disability [special report]*. Vancouver, Canada: Canadian Sport Centres.
- Higgs, C. & Trono C. (2013). *How is my sport doing with LTAD in Paralympic disciplines?* Vancouver, Canada: Canadian Sport Centres.
- Hunter, D. (2013). *Building enhanced collaboration between recreation and sport*. Ottawa, Canada: Canadian Parks and Recreation Association.
- Johnstone, L. & Millar, S. (2012). *Actively engaging women and girls: Addressing the psycho-social factors*. Ottawa, Canada: Canadian Association for the Advancement of Women in Sport and Physical Activity.
- Judo Canada LTADM Steering Committee - Dr Wright, R., Cardinal, C., Jani, L., Dr Kendrick, J., Landry, A., Morgan, K., Sadej, J., Vesin, P. (2006). *Judo Canada Long Term Athlete Development Model*. Judo Canada.
- MacNeill, K., Benz, L., Brown, M., Kabush, D. & van den Berg, F. (2013). *Canadian sport for life: Mental fitness for long-term athlete development*. Victoria, Canada: Canadian Sport Institute. Vancouver, Canada: Canadian Sport Centres.
- Mandigo, J., Francis, N. & Lodewyk, K. (2007). *Physical literacy: Ages 0-12 years [concept paper]*. Vancouver, Canada: Canadian Sport Centres.
- Millar, P. & Stevens, J. (2010). *Long-term professional development: The impact of manager training on NSO performance*. St. Catharines, Canada: Brock University.
- Samuels, C. & Alexander, B. (2013). *Sleep, recovery, and human performance: A comprehensive strategy*

*for long-term athlete development*. Victoria, Canada: Canadian Sport Institute – Pacific.

Shelton, G. & Harber, V. (2013). *Becoming a Canadian sport for life community: Building an activation plan that works for your community 2.0*. Edmonton, Canada: Edmonton Sport Council.

True Sport (2012). *LTAD ethical literacy matrix*. Ottawa, Canada: True Sport.

Way, R. (2010). *CS4L moving forward: Collaboration paper, 2010-2013*. Vancouver, Canada: Canadian Sport Centres.

Way, R. & Balyi, I. (2007). *Competition is good servant, but a poor master*. Vancouver, Canada: Canadian Sport Centres.

Way, R., Balyi, I. & Grove, J. (2007). *Canadian sport for life: A sport parent's guide*. Ottawa, Canada: Canadian Sport Centres.

Way, R., Balyi, I. Harber, V., Jurbala, P., & Trono, C. (2013). *Quality sport and physical activity for all Canadians*. Vancouver, Canada: Canadian Sport Centres.

Way, R. & O'Leary, D. (2006). *Long-term coach development concept*. *Coaches PLAN du coach* 12(3) 24-32.

## **Selected Bibliography**

Armstrong, N. & Welsman, J. (1997). *Young people and physical activity*. Oxford, United Kingdom: Oxford University Press.

Armstrong, N. & Welsman, J. (1997). Children in sport and exercise. *British Journal of Physical Education*, 28(2), 4–6.

Balyi, I. (1998, September). Long-term planning of athlete development: The training to train phase. *FHS: The UK's Quarterly Coaching Magazine*, 1, 8–11.

Balyi, I. (1998, December). Long-term planning of athlete development: The train to compete phase. *FHS: The UK's Quarterly Coaching Magazine*, 2, 8–11.

Balyi, I. (1999, May). Long-term planning of athlete development: Multiple periodisation, modeling and normative data. *FHS: The UK's Quarterly Coaching Magazine*, 4, 7–9

Balyi, I. (2001, summer). Sport system building and long-term athlete development in Canada. *Coaches Report: The Official Publication of the Canadian Professional Coaches Association*, 8(1), 25–28.

Balyi, I. & Hamilton, A. (1999, April). Long-term planning of athlete development: The training to win phase. *FHS: The UK's Quarterly Coaching Magazine*, 3, 7–9.

Balyi, I. & Hamilton, A. (2003). Long-term athlete development: Trainability and physical preparation of tennis players. In M. Reid, A. Quinn, & M. Crespo (Eds.). *Strength and conditioning for tennis* (pp. 49–57). London, United Kingdom: International Tennis Federation.

Balyi, I. & Way, R. (1995). Long-term planning of athlete development: The training to train phase. *B.C.*

*Coach*, 2–10.

Balyi, I. Way, R., & Higgs, C. (2013). *Long-Term Athlete Development*. Champaign, IL: Human Kinetics.

Balyi, I., Way, R., Higgs, C., Norris, S. & Cardinal, C. (2005). *Canadian sport for life: Long-term athlete development* [Resource paper]. Vancouver, Canada: Canadian Sport Centres.

Bar-Or, O. (1983). *Pediatric sport medicine for the practitioner: From physiologic principles to clinical applications*. New York, NY: Springer Verlag.

Bar-Or, O. (1996). Developing the prepubertal athlete: Physiological principles. In J. P. Troup, A. P. Hollander, D. Strasse, S. W. Trappe, J. M. Cappaert & T. A. Trappe, (Eds.), *Biomechanics and Medicine in Swimming VII* (135–139). London, United Kingdom: E & FN Spon.

Bar-Or, O. (2001). Nutritional considerations for the child athlete. *Canadian Journal of Applied Physiology*, 26 [Supplement], 18 6–191.

Bar-Or, O. (Ed.). (1996). *The child and adolescent athlete*. London, United Kingdom: Blackwell Publishing.

Belov, E. (1995). *For those starting artistic gymnastics*. Ottawa, ON: Canadian Gymnastics Federation.

Blimkie, C. J. R. & Marion, A. (1994). Resistance training during preadolescence: Issues, controversies, and recommendations. *Coaches Report*, 1(4), 10-14.

Blimkie, C.J.R. & Bar-Or, O. (1996). Trainability of Muscle Strength, Power and Endurance during Childhood. In O. Bar-Or (Ed.), *The child and adolescent athlete*. London, United Kingdom: Blackwell Publishing.

Bloom, B. (1985). *Developing talent in young people*. New York, NY: Ballantine Books.

Bompa, T. (1995). *From childhood to champion athlete*. Toronto, Canada: Veritas.

Borms, J. (1986). The child and exercise: An overview. *Journal of Sport Sciences*, 4, 3–20.

Bouchard, C., Malina, R.M. & Pérusse, L. (1997). *Genetics of fitness and physical performance*. Champaign, IL: Human Kinetics.

Dick, F. W. (2007). *Sports Training Principles* (5th ed.). London, United Kingdom: A & C Black.

Docherty, D. (1985). *Trainability and Performance of the Young Athlete*. Victoria, Canada: University of Victoria.

Dozois, E. (2002, November). *Calgary Health Region daycare project: Focus group report*. Calgary, Canada: Calgary Health Region.

Drabik, J. (1996). *Children and sports training: How your future champions should exercise to be healthy, fit, and happy*. Island Pond, VT: Stadion.

Ericsson, K. A. & Charness, N. (1994). Expert performance: Its structure and acquisition. *American Psychologist*, 49(8), 725–747. Ericsson, K. A., Charness, N., Feltovich, P. J. & Hoffman, R. R. (Eds.).

(2006). *The Cambridge handbook of expertise and*

*expert performance*. New York, NY: Cambridge University Press.

Ericsson, K. A., Krampe, R. T. & Tesch-Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, 100(3), 363–406.

Erikson, E. (1959). *Identity and the life cycle: Psychological issues I*. New York, NY: International

Universities Press.

Erikson, E. (1964). *Insight and responsibility: Lectures on the ethical implications of psychoanalytic insight*. New York, NY: W. W. Norton.

Gallahue, D. L. & Donnelly, F.C. (2003). *Developmental physical education for all children* (4th ed.). Champaign, IL: Human Kinetics.

Gibbons, T., Hill, R., McConnell, A., Forster, T. & Moore, J. (2002). *The path to excellence: A comprehensive view of development of U.S. Olympians who competed from 1984-1998*. Results of the Talent Identification and Development Questionnaire to U.S. Olympians.

Harsanyi, L. (1983). A 10-18 éves atletak felkészítésének modellje. *Utánpótlásnevelés*, 10, (n.p.).

Haywood, K. M. & Getchell, N. (2001). *Lifespan motor development* (3rd Ed.). Champaign, IL: Human Kinetics.

Higgs, C. & Way, R. (Eds.). (2005). Sport Canada: Strategic Leadership for Sport [Figure]. Modified from *Sport England*, 2004. Higgs, C., Way, R., Balyi, I., Norris, S. & Cardinal C. (2012). *No accidental champions: Long-term athlete development for athletes with a disability* (2nd ed.). Vancouver, Canada: Canadian Sport Centres.

High Performance Advisory Committee. (1999). Alpine integration model [Figure]. Alpine Canada Alpine.

International Gymnastics Federation. (2000). *Age group development program*. CD Rom.

Jess, M. (1999). *Basic movements and movement concepts: A developmental framework for a lifetime of PE, sport and exercise*. Edinburgh, United Kingdom: University of Edinburgh.

Kobayashi, K., Kitamura, K., Miura, M., Sodeyama, H., Murase, Y., Miyahita, M. & Matsui, H. (1978). Aerobic power as related to body growth and training in Japanese boys: A longitudinal study. *Journal of Applied Physiology*, (44)5, 666–672.

Littrean, M. (2015) *Judo Development Program for Trinidad and Tobago and the Lesser Antilles 2015-2020 (Part 1)*, Mark Littrean

Lynn, M. A. T. & Staden, K. (2001, fall). The obesity epidemic among children and adolescents. *WellSpring*, 12(2), 5–6. MacDougall, J. D., Wenger, H. A. & Green, H. J. (Eds.). (1982). *Physiological testing of the elite athlete*. Canadian Association of Sports Sciences in collaboration with the Sports Medicine Council of Canada.

Malina, R. M. & Bouchard, C. (1991). *Growth, maturation, and physical activity*. Champaign, IL: Human Kinetics.

Malina, R.M., Bouchard, C. & Bar-Or, O. (2004). *Growth, Maturation, and Physical Activity*. Champaign, IL: Human Kinetics.

McWhorter, W., Wallman, H. W., & Alpert, P. T. (2003). The obese child: Motivation as a tool for exercise. *Journal of Pediatric Health Care*, 17, 11–17.

Nadori, L. (1986). *Az edzés elmelete es modszeretana*. Budapest, Hungary: Sport.

National Coaching and Training Centre (2003). *Building pathways in Irish sport: Towards a plan for the*

*sporting health and well-being of the nation*. Limerick, Ireland: University of Limerick.

Norris, S. R. & Smith, D. J. (2002). Planning, periodization, and sequencing of training and competition: The rationale for a competently planned, optimally executed training and competition program, supported by a multidisciplinary team. In M. Kellmann (Ed.), *Enhancing recovery: Preventing underperformance in athletes* (pp.121-141). Champaign, IL: Human Kinetics.

PHE Canada (2007). Physical literacy definition. Retrieved August 13, 2013, from [www.phecanada.ca/programs/physical-literacy](http://www.phecanada.ca/programs/physical-literacy)

Piaget, J. (1954). *The construction of reality in the child*. (M. Cook, Trans.). New York, NY: Basic Books. (Original work published 1937)

Ross, W.D. & Marfell-Jones, M.J. (1982). Kinanthropometry. In J. D. MacDougall, H. A. Wenger & H. J. Green (Eds.), *Physiological testing of the elite athlete* (pp. 75–104). Ithica, NY: Movement Publications.

Rowland, T. W. (2005). *Children's exercise physiology* (2nd ed.). Champaign IL: Human Kinetics.

Rowland, T. W. & Boyajian, A. (1995). Aerobic response to endurance training in children. *Pediatrics*, 96(4), 654–658.

Rushall, B. (1998, summer). The growth of physical characteristics in male and female children. *Sports Coach*, 20, 25–27.

Sanderson, L. (1989). Growth and development considerations for the design of training plans for young athletes. *Coaching Association of Canada: Sports*, (10)2, (n.p.).

Tanner, J.M. (1973). Growing up [Figure]. *Scientific American*, 223(3), 34–43.

Tanner, J.M. (1999). *Foetus into man: Physical growth from conception to maturity* (2nd ed.) Ware, United Kingdom: Castlemead.

Technical Committee (2013) *Judo Trinidad and Tobago National Promotion System, Guidelines and Syllabus*. Judo Trinidad and Tobago.

Thumm, H-P. (1987). The importance of the basic training for the development of performance. *New Studies in Athletics*, 1, 47-64.

Tihanyi, J. (1990). Long-term planning for young athletes: An overview of the influences of growth, maturation and development. Sudbury, Canada: Laurentian University.

Tucker, R. (2011, August 9). Genes vs Training: The secrets of success [Web blog post]. *The science of sport*. Message posted to [www.sportsscientists.com/search?q=10,000+hours](http://www.sportsscientists.com/search?q=10,000+hours)

Valentine, J. (2003, winter). Don't children get all the exercise they need from playing? *WellSpring*, 14(1), 6–8.

Viru, A. A. (1995). *Adaptation in sports training*. Boca Raton, FL: CRC Press.

Viru, A., Loko, J., Harro, M., Volver, A., Laaneots, L. & Viru, M. (1999). Critical periods in the development of performance capacity during childhood and adolescence. *European Journal of Physical Education*, 4(1), 75–119.

Viru, A. Loko, J., Volver, A., Laaneots, L., Karlesom, K. & Viru, M. (1998). Age periods of accelerated improvements of muscle strength, power, speed and endurance in age interval 6-18 years. *Biology of Sport*, 15(4), 211–227.

Vorontsov, A.R. (1999). Multi-year training of young athlete as potential modifier of growth and development (Analysis of some biological concepts). Retrieved August 19, 2013, from [www.coachesinfo.com/index.php?option=com\\_content&view=article&id=81:swimming-multi-year-training&catid=49:swimming-coaching&Itemid=86](http://www.coachesinfo.com/index.php?option=com_content&view=article&id=81:swimming-multi-year-training&catid=49:swimming-coaching&Itemid=86)

Wieneck, J. (1990). *Manuel d'entraînement*. Paris, France: Vigot.