



TRANSITION PHASE

Long-Term Athlete Development



CANADIAN WEIGHTLIFTING FEDERATION HALTÉROPHILE CANADIENNE

2003 World Weightlifting Championships VANCOUVER 2003



lifting

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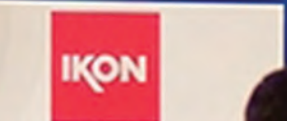


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PRESIDENT'S MESSAGE

Long-Term Athlete Development (LTAD) represents a new approach in the identification of talent and the development of athletes in Canada. It is a system of training, competition and recovery based on the maturation and developmental age of the athlete rather than simply chronological age. It is a response to the current sport system which often results in athlete burnout and loss of potential.

As its name would suggest, LTAD encompasses a long-term systematic approach in the development of athletic excellence. LTAD introduces athletes to fundamental motor skills at an early age, and then encourages them to develop these skills prior to specializing in a particular sport and entering into the competitive stream. While the focus remains on competitive development, one of the underlying objectives of LTAD is to promote lifelong participation in sport and physical activity.

For the Canadian Weightlifting Federation, LTAD provides a comprehensive framework for our athlete and program development throughout Canada. Following the concepts of participation and development expressed in the general LTAD model, the implementation of LTAD by the Canadian Weightlifting Federation will encourage coaches to introduce young athletes to fundamental motor skills and training methodologies prior to the introduction of sport-specific skills particular to Weightlifting. Only then will the athlete be introduced to the rigours of competition, with a new emphasis on Train to Compete and Train to Win, with the ultimate objective of achieving athletic excellence on the world stage.

Paul Barrett
CWFHC President

FOREWORD

In creating the Long Term Athlete Development (LTAD) model for Weightlifting in Canada, the worst part of the process – and at the same time, the best part – has been the need to look at where we are presently, where we would like to go, and what we will need to improve on to get there. Some people in weightlifting may find the contents of this document challenging, while others may not be surprised at all.

Many parents and individuals involved in sport raise their eyebrows when you talk about strength training for young boys and girls, and especially Olympic Weightlifting. Many reasons are quoted, but most are actually myth.

The truth is that it is most beneficial for young athletes to begin learning Olympic Weightlifting between the ages of 9–14 years. With young athletes, the focus simply needs to be technique, not load. At the same time, these same young athletes need to be developing all of the important foundation skills and physical capacities required to be successful in sport. If the athletes entering Olympic Weightlifting are not physically literate in fundamental movement and fundamental sport skills, they will need to improve their physical literacy as they enter the beginning stage(s) of Weightlifting.

From looking at other sport LTAD documents, it appears that weight training is being introduced too late within the development of their athletes. I suspect that there is not much thought regarding skill development beginning earlier which is required to maximize performance success down the road. Also, I do not think that much thought is given to developing strong ties with local Olympic Weightlifting Clubs so that proper technique is introduced earlier instead of late when it becomes more difficult for the athlete to learn.

If we are truly serious about developing sport in Canada, then we must take a different approach to Olympic Weightlifting and weight training in general so that more Canadian athletes can realize their true potential. Too often I hear from those who start late in the sport of Olympic Weightlifting, and those athletes who begin utilizing Olympic Lifts to improve their performance in other sports, that they wished they had been exposed to the Olympic Lifts much earlier.

It is time to dispel the myths and change some of the misunderstanding around Olympic Weightlifting. With the introduction of LTAD, the Canadian Weightlifting Federation seeks to initiate that change for the long-term health and success of our athletes.

Guy Greavette
CWFHC LTAD Project Coordinator



EXECUTIVE SUMMARY

Olympic Weightlifting is a sport with history in Canada, with a bright potential ahead. Though our sport has undergone decline in recent decades – through decreased participation rates, shortages of coaching, and other challenges – there are many hopeful signs that reflect the huge potential to develop the sport in this country. There are already thousands of Canadians using resistance training for fitness and cross training in other sports, and our National Weightlifting athletes have driven a recent resurgence of success on the international stage. By promoting the LTAD pathway and accompanying changes to the sport system, we can imagine Weightlifting taking on a much larger role in Canadian sport and we can promote even greater success for our high performance athletes.

LTAD provides a rational approach to developing our Olympic Weightlifting athletes based on sport science and best practices in coaching. Through LTAD, and increased understanding of key factors such as trainability and physical literacy, Weightlifting can grow substantially as a sport and bring more athletes into the fold. With greater numbers of participation, Weightlifting can serve two noble purposes: greater wellness for larger numbers of Canadians who pursue Weightlifting as a recreational sport, and more frequent podium performances by larger numbers of elite Canadian Weightlifters at the Olympics and World Championships.

However, implementing LTAD will have significant implications for every facet of the Weightlifting “sport system” in Canada. LTAD will require greater cooperation and communication within the Weightlifting community, including a concerted effort to share resources, secure new funding, promote integration from the grassroots to the National level, and improve the overall

identity and strength of our sport. This means LTAD will need support from diverse stakeholders who may have to set aside personal interests for the greater success of Canadian Weightlifting as a whole. All the while, implementation must also follow logical planning that accounts for the financial, social and geographical realities of our sport in Canada.

For these reasons and many more, implementation of the Weightlifting LTAD must be approached with patience, understanding, resolve, and a firm sight on the goal of strengthening the sport in Canada. We want to do more than simply help our Weightlifters win medals: we want to promote a lifelong love of the sport and build the skills and capacities that will serve our athletes at all levels for years to come, and retain them in the system as coaches, officials, volunteers and sport leaders. Some of our athletes may choose to pursue medals at the National and International level, while others may simply pursue Weightlifting as part of an active lifestyle. LTAD is designed to serve the needs of both, and to grow our sport as a whole.

We all play a role in ensuring that the Weightlifting LTAD is a **success**, whether we are coaches, administrators, parents or athletes. LTAD will guide all those involved in Canadian Weightlifting in examining our practices in coaching, training, and competition and how these practices affect the ongoing development of our athletes. LTAD provides the road map to ensure we are serving the best interests of our athletes and ultimately the sport of Olympic Weightlifting.

Maryse Turcotte – 2000 &
2004 Olympian



Doug Hepburn – 1953
World Champion



THE HISTORY OF OLYMPIC WEIGHTLIFTING

In ancient Egypt and Greece, the lifting of weights was a basic athletic activity and a natural means to measure Strength and Power. Modern Olympic Weightlifting began as a sport chiefly in the 19th Century, and it was one of the original sports contested in the first modern Olympic Games (Athens, Greece, 1896). The first World Championships in Olympic Weightlifting were staged in London five years previously on March 28, 1891 with 7 athletes representing 6 countries.

Weightlifting has a long history in Canada, dating back to legendary strongman Louis Cyr and 1953 World Champion Doug Hepburn. Russ Prior won three consecutive Commonwealth Games (1970, 1974, 1978) and a Bronze Medal in the Snatch during the 1976 World Championships (held in conjunction with the 1976 Olympic Games). Silver Medals were won by both Gerald Gratton (1952) and Jacques Demers (1984) at the Olympic Games. Current top weightlifters include Jeane Lassen (Silver Medal in Clean & Jerk and Bronze Medal in Total at the 2006 World Senior Championships) and Maryse Turcotte (Silver Medal in Clean & Jerk 1998, Bronze Medal in Clean & Jerk 2002 and 2003 World Senior Championships).

Olympic Weightlifting is the only sport whose history spans three centuries in world competitions, from 1891 through to the 21st century.

INTRODUCTION

Olympic Weightlifting is a sport that represents the competitive application of resistance training. Resistance training includes all types of physical training against resistance, such as training with free weights or with machines. Other common names include weight training, weightlifting, and strength training. In Canada, resistance training is one of the fastest growing fitness activities, with more than 380,000 Canadians currently participating in weightlifting-related training.

Resistance training is commonly used for general fitness and for targeted programs to enhance **muscular strength** and **explosive power** in athletes within their respective sports. Olympic Weightlifting, however, is an Olympic sport representing a specific type of resistance training using free weights.

Olympic Weightlifting involves two competitive movements: the Snatch, and the Clean and Jerk. These movements require strength, speed, power, flexibility, technical precision, body awareness, coordination, and excellent athletic conditioning. Olympic Weightlifting should not be confused with other weight lifting and weight training sports, such as Powerlifting and Bodybuilding.

The training methods of Olympic Weightlifting have been recognized for their value in training athletes in other sports. The most recognized reason is the

¹ Statistics Canada, 1998.

effect of Weightlifting on physical fitness, including strength, power, explosiveness and flexibility. A second reason is that weightlifting as a skill develops motor coordination that transfers to improved movement quality in other sports. Olympic Weightlifting training has been applied to enhance athlete performance in sports ranging from hockey and football to alpine skiing, across all levels of competition (recreational, college/university, elite). While many strength trainers use simple resistance training, the Olympic lifts have been proven to be a superior method of developing **strength, speed and power** specific to most sports.

The experts in the basic and complex methodology of Olympic Weightlifting are the coaches of the Canadian Weightlifting Federation Halterophilie Canadienne (CWFHC), including those club coaches certified by the CWFHC at all levels.

Challenges for Weightlifting in Canada

Historically, the sport of Weightlifting has enjoyed much greater popularity in Europe and Asia than it has in North America. In the late 1960s and early 1970s, there were well over 100,000 registered weightlifters in the Soviet Union alone, and countries such as Turkey and Iran classified Weightlifting as their national sport. While North American lifters were highly competitive prior to the middle of the 1960s (including Canadians), sheer numbers and superior organization among our European counterparts, coupled with the lower participation rates on this side of the ocean, resulted in our athletes falling behind on the world stage.

The decline of Olympic Weightlifting in Canada had a number of causes. There was no structured system of athlete recruitment, no consistent process for talent identification, lack of facilities, too few qualified coaches, and poor overall retention of athletes in the sport. Many of these challenges persist today, compounded by coaching and development shortcomings and a lack of high performance training camps at the National level.

Coaching

From the coaching perspective, a major challenge is the development of expertise in coaching Weightlifting. While weightlifting exercises may be used by personal trainers and strength and conditioning coaches, many of these individuals do not have sufficient knowledge or experience to do so properly and safely. It is important for Canadians to recognize that Weightlifting is a sport and, as with other sports, only qualified coaches should be involved in Weightlifting instruction.

Myths about Weightlifting

At the grassroots level in Canada, where our sport hopes to recruit young athletes, we have also faced a number of misconceptions about Weightlifting that discourage



Russ Prior – 1976 World Championships Bronze Medalist

participation in our sport. For one, people tend to believe that only one body type is suited to Weightlifting, and that there are high rates of injury. There are also beliefs that Weightlifting will stunt the growth of young athletes, damage growth plates, create poor flexibility, generate excess bulk in females, make people physically slow, damage knees (i.e. squats with weights), or demand the eventual use of performance enhancing drugs.

WEIGHTLIFTING FACTS

There are 186 national federation members of the International Weightlifting Federation (IWF). Canada is represented by the Canadian Weightlifting Federation Halterophilie Canadienne (CWFHC).



Jacques Demers – 1984 Olympic Silver Medalist

Truth beyond the myths

All of these concerns are essentially myths based on lack of information or a few rare instances of poor coaching practices outside the sport of Olympic Weightlifting (i.e. Weight Training). A study conducted over a number of years has shown that participating in Olympic Weightlifting during the ages of 10-14 does not impede growth. Another study has shown that the injury rate in Weightlifting is far below the rates in perceived low-risk sports such as basketball, soccer, and athletics (see Appendix A). Canadian Weightlifting enforces some of the strictest anti-doping regulations and testing in the sport, resulting in no positive drug tests for our athletes for several years.

Strengths of Olympic Weightlifting

Remarkably, despite the myths and other challenges, our Canadian Weightlifting athletes have recently started to become competitive on the international stage again. This progress has been due to concerted efforts to address the needs of Weightlifting through an organized approach to development of the sport, and through careful and efficient use of very minimal resources. The CWFHC anticipates that the implementation of the LTAD program for Olympic Weightlifting in Canada will further enhance this progress for our athletes and the sport of Weightlifting as a whole.

After all, Weightlifting has many strengths. It is an Olympic sport, so it carries immediate recognition and prestige in

the International sporting community. (Canadian Women Weightlifters in particular have achieved great recent success in International competition.)

Weightlifting is also suitable to both genders, all ages, and all body types. It is an individual sport, so athletes are able to develop at their own pace, and cost of participation is relatively low. In contrast to many other sports, training is not affected by the environment (i.e. weather).

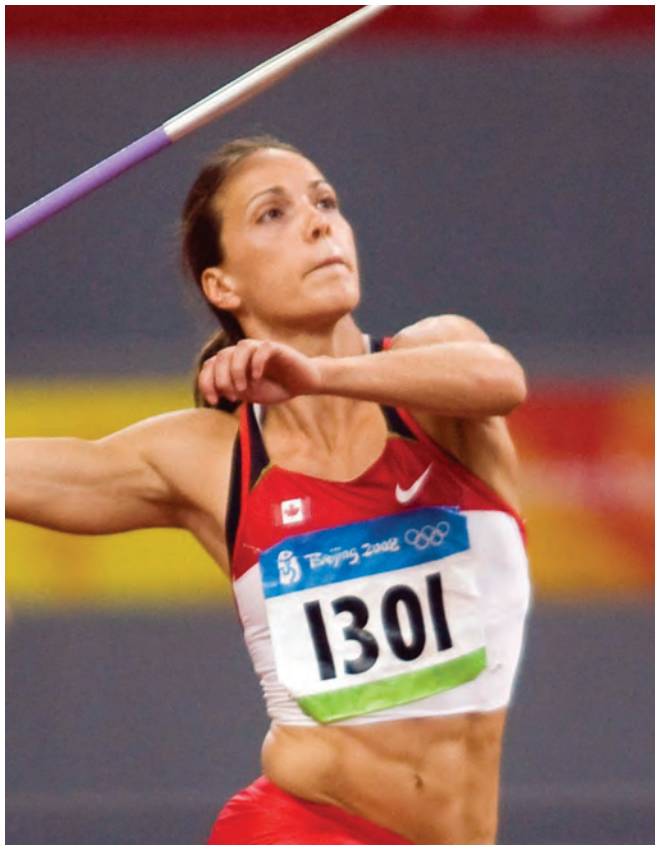
Weightlifting athletes, even “recreational” participants, develop a well-balanced physique. It develops training discipline and the concept of hard work, and it promotes good understanding of body mechanics and movement (e.g. Jumping – Power Cleans). Individual athlete progress is easy to measure, and this is good for self-esteem. Psychological benefits are also gained through increased physical strength.

With good coaching, Weightlifting is also a safe and effective method of developing **core stability**. It has a much lower injury rate than most sports (see Appendix A), and it can actually duplicate actions/movements in other sports, and thereby add cross-training benefits. Weightlifting is especially good for training **explosive power** specific to other sports, and it can provide a foundation to all sport training.

Olympic Weightlifting is a fun sport to be involved in, and it is never too late to start. While athletes can benefit most by entering the sport at younger ages, it is still possible to achieve great gains in training, and even competitive success, after entering at later ages (see 10 Key Factors – Specialization). Even where there are limited numbers of athletes in the same weight category, competition can be flexibly managed using a well-devised mathematical formula (Sinclair) that enables athletes of different bodyweight categories to compete against each other.

CANADIAN WEIGHTLIFTING TODAY

- Approximately 75-80 active clubs across Canada.
- Coaches are developed in gyms over 8-10 years.
- 10–15 true experts in the sport within Canada.
- Canadian Women’s team placed 12th overall at the 2006 World Championships.
- Best Women’s Team at the 2006 Commonwealth Games.
- Qualified 3 women and 2 men for the 2008 Olympic Games– the most Canadians at an Olympic Games since 1984.
- On pace to qualify 3 women and 1 man for the 2012 Olympic Games.



Olympic Weightlifting develops Explosive Power for Sport

LTAD for Olympic Weightlifting

The Long Term Athlete Development (LTAD) plan for Olympic Weightlifting in Canada has been created to ensure a consistent pathway for the training and development of our athletes. The LTAD plan was created as part of a Sport Canada project inspired and led by Canadian sport scientist Istvan Balyi and the LTAD Expert group.

The general concepts behind LTAD are not new in sport, but LTAD represents perhaps the first systematic approach to integrating the wide array of sport science research and best practices in coaching that have been demonstrated globally over recent decades. Through LTAD, the sport science and best practices are now being used to reshape our models of athlete training, competition and recovery so our Canadian athletes can achieve not only excellence on the international stage but also lifelong involvement in sport and physical activity.

LTAD provides a framework for participation in sport throughout the lifespan. This framework influences the structure of athlete training, coaching education, competition planning, and is essential for the recruitment and retention of individuals into the sport of Olympic

Weightlifting. An important goal of the Canadian Olympic Weightlifting community is to develop elite athletes capable of competing at the international level. This goal requires the coordination of programs and resources at the Club, Provincial Sport Organization (PSO) and National Sport Organization (NSO) levels.

LTAD is also important in bringing Olympic Weightlifting back into the milieu of valued sports in Canada. The Canadian Weightlifting Federation Halterophilie Canadienne (CWFHC) has worked very hard to ensure Canadian athletes compete without using methods of Doping. As can be seen with positive drug tests in many sports, performance enhancement drugs cannot be totally eliminated from sport; the CWFHC, however, is working hard to be a leader in anti-doping. The success of this work is evidenced by the absence of positive tests in our athletes in and out of competition for several years.

The Weightlifting LTAD will demonstrate how athletes can become strong and powerful through proper training techniques. In the process, they will demonstrate Olympic Weightlifting's value as a fundamental component within a range of sport training programs enjoyed daily by thousands of Canadians.



“The health and wellness of the nation and the medals won at major Games are simple by-products of an effective sport system.”

1. BACKGROUND ON LTAD

Excellence and Lifelong Wellness

Long-Term Athlete Development (LTAD) is built on the idea that with the right kind of planning and organization, our Canadian sport system can achieve two things for our athletes: excellence for those who pursue high performance, and lifelong wellness and activity for those who choose recreational participation. Essential to this approach is the principle that LTAD remains athlete-centered: all training, competition and recovery is designed with the best interests of both the developing and the elite athletes at heart. Coaches, parents, administrators and other external parties operate solely in supporting roles.

Why is it important that LTAD be athlete-centered? Historically, in many Canadian sports, the needs of our athletes have often been made secondary to the ambitions of coaches, parents and sport organizers. In this scenario, athletes have been driven to over-compete and under-train, particularly during pivotal developmental periods in childhood and early adolescence. They have spent too many hours competing, when they should have

spent more time practicing skills and developing the physical, mental and emotional capacities needed for their long-term success.

LTAD presents a balanced and scientific approach to training, competition and recovery to produce both higher achievement and long-term participation among athletes. This balance is created by respecting the physical, mental, and emotional maturation of athletes through the athlete-centered approach.

7 Stages of LTAD

LTAD identifies seven stages to describe the physical, mental, emotional and social development of an athlete from childhood to adulthood based on principles of maturation. Training and competition guidelines for each stage describe training and competition goals, optimal ratios of training to competition hours, and targets for development of technical, physical, psychological and ancillary capacities in the athlete. Through a systematic approach, LTAD optimizes athlete development at each

stage of maturation and avoids the hazards associated with arbitrarily imposing adult training regimens and competition formats on children.

The seven stages of the generic LTAD pathway are described below in simplified terms. Note that the seven stages of the Weightlifting LTAD (described in detail later in this document) represent a sport-specific adaptation of these stages; however, the developmental principles remain the same.

Active Start

(ages 0-6 years)

- Children are introduced to basic physical movement and activity in play settings. The emphasis is on fun and engagement in daily physical activity, not competition. Healthy activity and play stimulate development of their physical coordination and gross motor skills along with brain function, social skills, emotions, imagination, confidence and positive self-esteem.

FUNdamentals

(ages 6-9 males, 6-8 females)

- Through a variety of physical activities, children are introduced to fundamental movement skills such as running, jumping, throwing, hitting and kicking – activities that will later form the basis for most sports skills. Like the Active Start stage, the emphasis is on FUN.

Learn to Train

(ages 9-12 males, 8-11 females)

- Children transform their FUNdamental skills into sport-specific skills (e.g. Weightlifting skills) within structured training settings, though the emphasis is still on learning a variety of sports and avoiding early specialization.

Train to Train

(ages 12-16 males, 11-15 females)

- Pre-adolescents and adolescents consolidate their basic sport-specific skills and may begin moving towards specialization in one sport (e.g. Weightlifting), especially if they are identified as possessing special talent and choose to pursue high performance in their sport. However, they are still encouraged to participate in at least one other sport or activity, as well as maintain a baseline of athletic capacities. For athletes specializing in other sports, Weightlifting should be considered an integral component of training as it improves physical fitness.

Train to Compete

(ages 16-23 +/- males, 15-21 +/- females)

- Individuals have specialized in one sport and now work to optimize all of their athletic capacities – technical, tactical, physical, mental, emotional and more. Training regimens are intense, and the aim is to prepare the athlete for elite competition and podium performances.

Train to Win

(ages 19 +/- males, 18 +/- females)

- The elite athlete's physical, technical, tactical, mental, and lifestyle capacities are fully established. The focus of training shifts to the maximization of performance in order to win national and international competitions.

Active for Life

(any age males and females)

- Athletes transition from a competitive focus to lifelong participation in recreational sport and/or physical activity. This transition may occur at any time during the previous stages, though ideally no earlier than the Learn to Train stage, when individuals have mastered basic "physical literacy" (see FUNdamentals under The 10 Key Factors of LTAD).

The 10 Key Factors of LTAD

The 7 stages of LTAD have been defined according to 10 broad key factors that have been identified for successful athlete development. The 10 key factors relate to processes of human maturation and how these processes interact with training, competition and recovery program design through the athlete's lifetime. These key factors have been gleaned from the most current research in sport science, together with observed best practices in training, competition and coaching around the world.

1. Excellence Takes Time

Research suggests that it takes at least 8 to 12 years and 10,000 hours of training for an athlete to perform at an elite level. During this time, the athlete's training must address a comprehensive range of physical, psychological and cognitive capacities.

In Olympic Weightlifting, historical evidence suggests a minimum of 8 years of training is required to develop the ability to be able to compete at an international level. An additional 4+ years of training is necessary to compete at an elite international level, such as at the World Championships and Olympic Games.

Figure 1: Common Performance Growth Curve (CWFHC NCCP Level III)

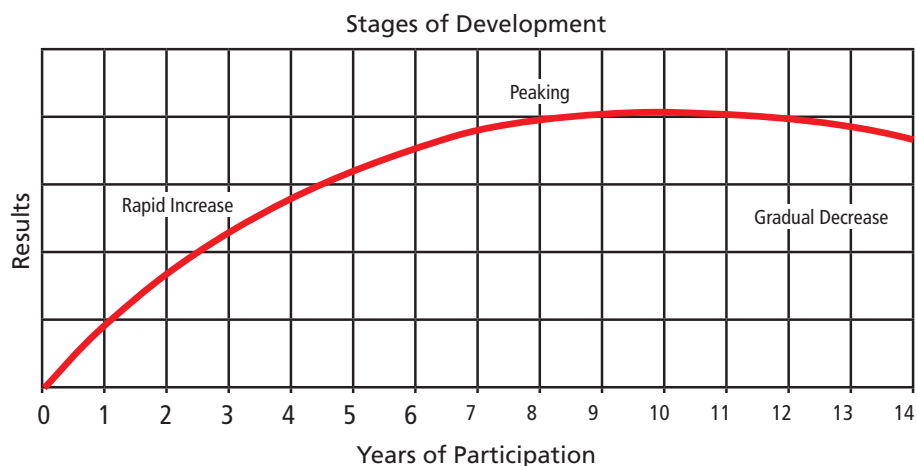


Figure 2: Average Ages of Olympic Weightlifters

MEN			
Averages	Age at first final Worlds or Olympics	Age in 1st Olympics	Age in Athens
Average age of all competitors:	22.8	24.3	26.0
Average age of medalists:	21.7	23.5	26.5
Average age of gold medalists:	20.4	22.1	24.6
WOMEN			
Averages	Age at first final Worlds or Olympics	Age in 1st Olympics	Age in Athens
Average age of all competitors:	20.5	22.8	24.1
Average age of medalists:	21.3	22.8	24.1
Average age of gold medalists:	20.1	22.0	23.1

Clearly, the development of an Olympic Weightlifter is a long-term process. Weightlifting coaches and athletes should therefore avoid a short-term focus on performance as this can be detrimental to the development of the Weightlifting athlete.

2. The FUNdamentals

All sports are based on fundamental movement skills and fundamental sports skills. Fundamental movement skills are closely associated with the ABCs – Agility, Balance, Coordination and Speed – and they include basic movement skills such as running, jumping, skipping, throwing, and catching. Fundamental sports skills are those fundamental movement skills applied to a basic sport activity, such as throwing a basketball to score a basket, or catching a baseball after a batter has hit it into the air.

Research has demonstrated that children will experience more success and achievement in sport if they are trained to be physically “literate” in these skills prior to their adolescent growth spurt. They will also be more likely to pursue lifelong recreational physical activity and maintain greater levels of wellness. Physical literacy is the development of fundamental movement skills and fundamental sport skills that permit a child to move confidently and with control in a wide range of physical activity, rhythmic (dance) and sport situations. Physical literacy also includes the ability to “read” what is going on around them in an activity setting and react appropriately to those events.

Fundamental skills and physical literacy are acquired by participating in a range of sports and physical activities during childhood. Fundamental movement skills and fundamental sport skills should be widely incorporated

into the early stages of Olympic Weightlifting training in order to supplement the training provided by other components of the sport system, such as schools and recreation centres.

3. Specialization

Some sports require “early specialization” to obtain elite performance levels, such as gymnastics and figure skating, while other sports see better athlete performance in “late specialization,” such as basketball, soccer, tennis and Weightlifting.

As a late specialization sport, Olympic Weightlifting relies on the overall sport system (pre-schools, schools, recreation centres, other sports) to assist future Weightlifters in developing physical literacy during childhood. LTAD discourages early specialization in Weightlifting (e.g. prior to the age of 10-14 years) since premature specialization contributes to overuse injuries, early burnout, and inadequate development of fundamental movement and sports skills.

International trends over the past two decades have seen the age of specialization in Olympic Weightlifting shift from 14 years in the 1970s to 12 years in the 1980s, and more recently 10 years in the 1990s (Dimitrov 1993). The decreasing age of specialization does not affect the time required to become proficient in Olympic Weightlifting (i.e. 8 years – see Excellence Takes Time). However, it does mean that elite Olympic Weightlifters are appearing in competition at younger ages.

Olympic Weightlifting requires a foundation of fundamental motor skills, specifically jumping, coordination and body awareness (Enoka 1979; Garhammer & Gregor 1992). Therefore, care should be taken to ensure specialization in Olympic Weightlifting does not compromise the development of the fundamentals (i.e. premature specialization).

Older athletes (i.e. 14-18 years) should not be discouraged from specializing in Olympic Weightlifting. Olympic Weightlifting success is largely affected by muscular strength and power (Carlock et al. 2004; Haff et al. 2005), and these characteristics are best developed post-adolescence. As well, athletes from other sports can specialize late in Olympic Weightlifting and still achieve a high level of success. Many of Canada’s best Olympic Weightlifters have transferred over from



other sports, including gymnastics, martial arts and athletics. Participation in these sports contributes to the development of a high level of physical literacy that can be beneficial for success in Olympic Weightlifting.

4. Developmental Age

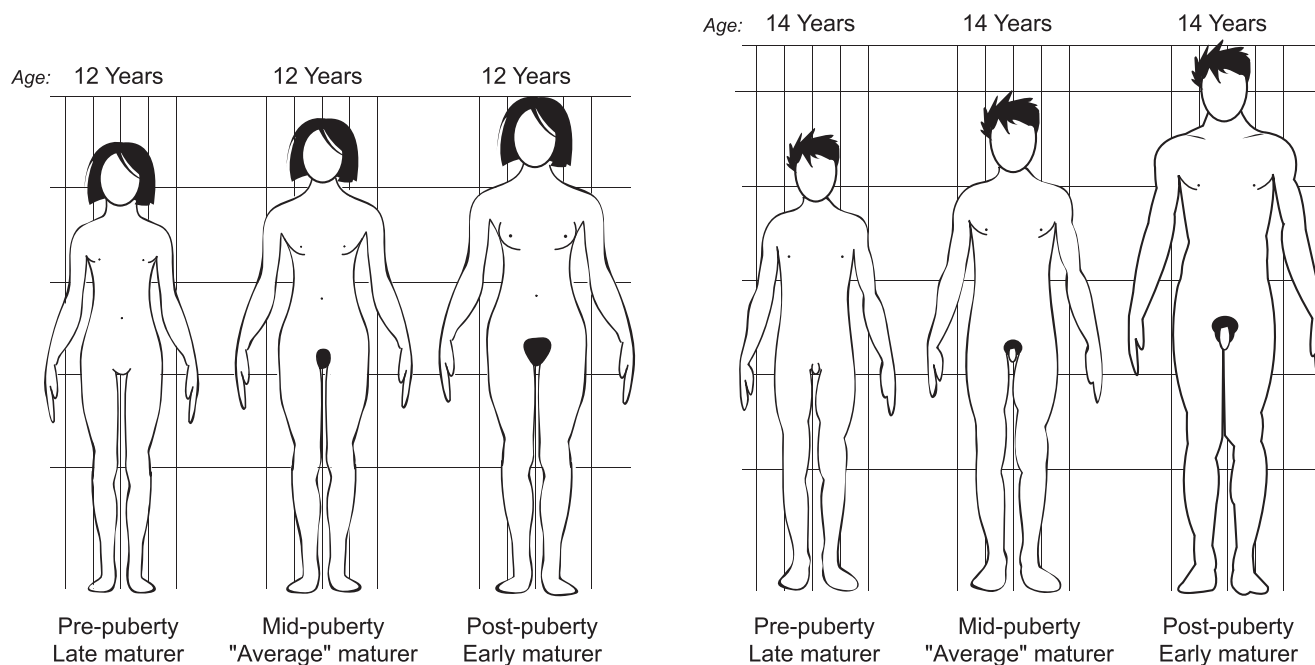
Everyone passes through the same stages of development from early childhood through adolescence, but the timing and rate of development varies. This is described as the difference between chronological age and developmental age. Two children may be the same chronological age (e.g. 12 years old), but they may be four to five years apart in developmental age. Weightlifting coaches need to take into account these differences in developmental age when they design programs for their adolescent and post-adolescent athletes.

²Dalton, S. E. (1992). Overuse injuries in adolescent athletes. *Sports Medicine*, 13, 58–70.

³Henschen, K. P. (1998). Athletic staleness and burnout: Diagnosis, prevention, and treatment. In J. M. Williams (Ed.), *Applied sport psychology: Personal growth to peak performance* (3rd Edition), (pp. 398–408). Mountain View, CA: Mayfield.

⁴Wiersma, L. D. (2000). Risks and benefits of youth sport specialization: Perspectives and recommendations. *Pediatric Exercise Science*, 12, 13–22.

Figure 3: Maturation in Boys and Girls (Adapted from "Growing Up" by J.M. Tanner, 1973)



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

Firstly, adolescents can be classified as early or late maturers, meaning peak height velocity (PHV), muscle mass growth, and skeletal growth may occur at different times for different athletes. These developmental features are influenced by societal and cultural factors, including each athlete's pre- and post-natal nutrition.

Secondly, cessation of skeletal growth and the age of full maturation of the adult skeleton vary between individuals, and it also varies between males and females. (The female skeleton generally matures by approximately age 18, whereas full maturation of the male skeleton generally occurs around age 22, and sometimes as late as 26 years.) Accordingly, heavy loading should be carefully controlled prior to skeletal maturity. Development of strength is best achieved after 16-18 years when the body begins to mature (Barnekow-Bergkvist et al. 1996).

Training of the Olympic Weightlifter should consider both developmental and training age. The optimal age range for entry into Olympic Weightlifting is 10-14 years (Dimitrov 1993; Kauhanen 1997). Young athletes should be introduced to Olympic Weightlifting technique prior to their growth spurt (generally 10-11 years for girls and 13-14 years for boys). Regardless of their developmental age, training programs for beginners (i.e. weightlifters with

low training age) should share an emphasis on technical/skill development. However, other aspects of their training program, such as strength development, will depend on their developmental age.

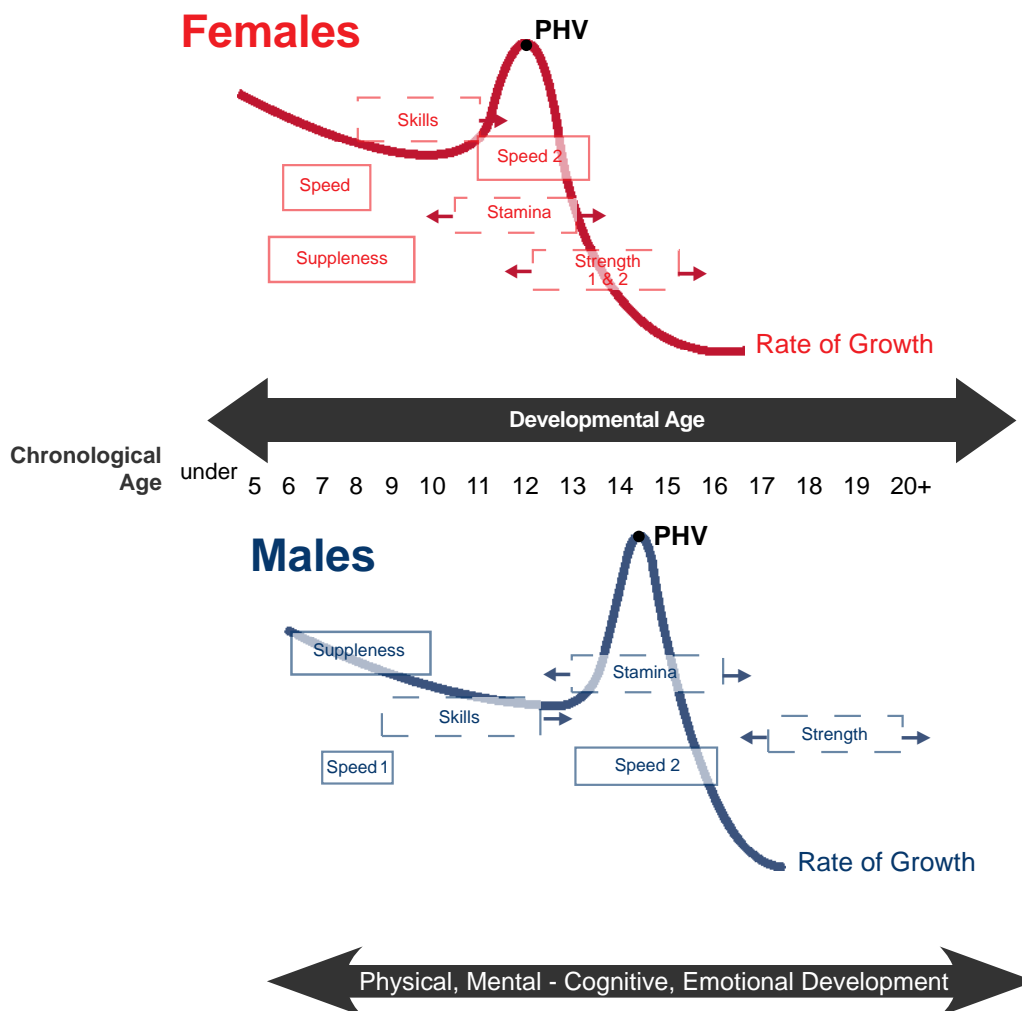
5. Trainability

Trainability 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 (e.g. stamina, strength, speed, skill and suppleness).

Accordingly, to reach their full genetic potential, Weightlifters need to receive the right type of training at the correct stage of development. If the sensitive periods are missed, Weightlifters may grow to be strong and skilled, but they may never be as strong and skilled as they could have been if their training had made maximum use of the sensitive periods or "windows" of optimal trainability.

NOTE: Trainability is often confused with adaptation. Adaptation refers to actual functional and/or morphological changes that occur in an athlete's body as a result of training (e.g. stronger muscles, better aerobic endurance).

Figure 4: Sensitive Periods of Accelerated Adaptation to Training



6. Physical, Mental, Cognitive, and Emotional Development

As athletes grow from childhood through adolescence, they experience significant changes in their physical, mental, cognitive, and emotional capacities. Coaches need to consider these changes as they plan training regimens and competition programs for their athletes. (See Appendix 1, Canadian Sport for Life 2005, pp.54-61.) Failure to account for these changes may result in mental or emotional burnout, undue mental stress, anxiety, diminished confidence, and early exit from the sport.

Sport participation is an important avenue to develop mental skills that contribute to success in and out of sport. Athletes participating in organized training programs develop morals consistent with fair play, discipline and determination, and work ethic.

Research indicates that children and adolescents participating in Olympic Weightlifting and related activities have better grades, longer attention spans, and more positive mood states. Experience has also shown that elite Olympic Weightlifters display the ability for intense concentration, muscular relaxation, or mental flexibility – skills that should be systematically developed throughout the various developmental stages.

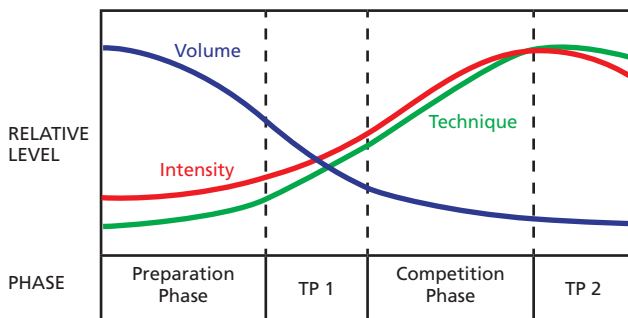
7. Periodization

Periodization refers to creating logical and scientific-based schedules for athlete training, competition, and recovery, giving consideration to choice of exercise, order of exercise, volume, intensity, and rest. Periodization plans typically address training and competition over the moderate-term, such as a yearly training plan or a quadrennial (4 year) training plan (Matveyev 1981). Periodization takes

into account the most important competitions and makes allowances so the Olympic Weightlifter can achieve maximum performance at these competitions.

Through periodization, a yearly training plan is divided into macrocycles (Stone et al. 1981). Each macrocycle typically serves one major competition. Each macrocycle is further divided into mesocycles (typically 1 month each) which identify the focus of training during that time. Mesocycles are divided into microcycles, or individual weeks of training. The following graph depicts the classic periodization scheme for Olympic Weightlifting:

Figure 5: Matveyev's Principle



Periodization aims to train motor skills and physical capacities in order to capitalize on each previous training block. For example, muscular endurance provides the foundation for developing strength and power, therefore muscular endurance training must precede training in strength and power. As the macrocycle progresses, emphasis shifts from training of physical capacities to training motor skills (technique).

At every stage of athlete development, periodization plans should be adjusted to account for each athlete's growth, maturation, and trainability. (For more information on periodization, please refer to Training Periodization for the Olympic Weightlifter, available on the CWFHC website at www.canadianweightlifting.ca.)

8. Calendar Planning for Competition

Calendar planning for competition is critical to athlete development at all stages. Different stages of development and maturation have different requirements for the type, frequency, and level of competition.

In the early stages of an Olympic Weightlifting career, development of physical capacities takes precedence over high-level competition. Club competitions in the form of individual or team events, or specific skill tests

such as lifting technique or jumping ability, provide an opportunity to assess and monitor each athlete's progress.

At later stages, the focus shifts to more formal competition. The events calendar should provide further developmental events (Inter-club or Provincial competitions), selection events (Regional competitions), and major events (National and International competitions).

For elite weightlifters, an Olympic quadrennial (4 year) plan should be established. Regardless of each athlete's level, the competition schedule should be established based on the athlete's individual developmental needs.

9. System Alignment and Integration

LTAD recognizes that each athlete's development is affected by the variety of different sport and physical activity environments they experience as they grow through childhood and adolescence. These range from club sport programs to physical education programs at school, recreational activities, and school sports. Each athlete's development is also impacted by the larger sphere of 'sport system' stakeholders in the form of facilities owners, health professionals, and even government policy makers in the areas of sport, recreation, health, and education.

LTAD encourages these different sport groups, institutions, and organizations to work cooperatively to serve the best interests of the athletes, ensuring that they are mutually supportive, clear in their roles and responsibilities, and aware of how they contribute to the process of development. In short, Olympic Weightlifters will develop best in a coordinated sport system that is clearly defined, logically structured, and based upon consistent principles.

As a late-specialization sport, Olympic Weightlifting must especially rely on schools, recreation centers, and other sport groups to develop physical literacy and early fitness. Following from this early development, the LTAD pathway for Weightlifting allows athletes to identify the opportunities available to them in the sport, understanding the pathway they need to follow in accordance with their personal sporting aims.

Just as the Olympic Weightlifters on the competition platform must integrate and align their movements, the components of the Olympic Weightlifting system must integrate and align their activities. All parts of the Canadian Olympic Weightlifting system – clubs, schools, provincial associations, CWFHC – need to promote integration and alignment with one another. Similarly, Canadian Olympic Weightlifting needs to interact with the community of health professionals, colleges & universities, professional organizations, and private enterprises.

10. Continuous Improvement

LTAD is based on the best available research in sports science and the best practices in athlete training around the world, but sport science and training methodologies are always being refined. The 'continuous improvement' approach can ensure that Olympic Weightlifting in Canada reacts in a timely manner to new scientific research and sport-specific innovations. Similarly, a desire for continuous improvement should also help to

stimulate new research and advances where needed. Olympic Weightlifting should be prepared to embrace emerging innovations in physical education, sport, and recreation to ensure progress and reliability in the systematic and logical delivery of training programs at all ages. In the larger sport community, LTAD should also support education, promotion and advocacy for athlete development with government, media, educators, parents, coaches, administrators, sport scientists and health professionals.

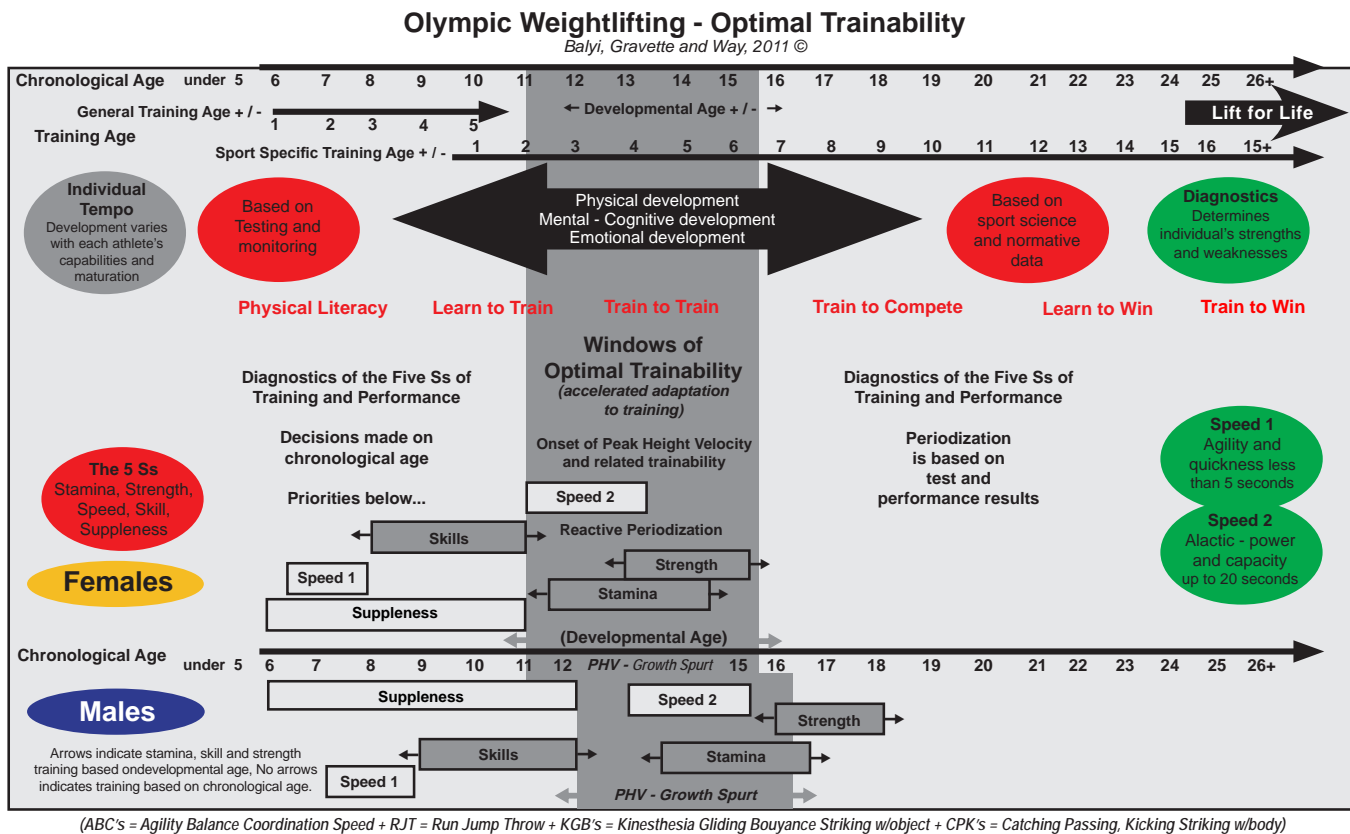
Trainability and the 10 Ss

In considering trainability, LTAD looks at 10 Ss of training that describe ten distinct capacities of the athlete. The ten Ss include five physical capacities: stamina (endurance), strength, speed, skill and suppleness (flexibility). Beyond these five physical capacities, there are five general Ss that complete the holistic development of the athlete: (p)sychology, structure/stature, sustenance, schooling and socio-cultural. Each of these capacities is trainable throughout an athlete's lifetime, but there are clearly sensitive periods when each capacity will undergo optimal development through training.

These sensitive periods are sometimes referred to as "windows of trainability," and they vary between individuals according to their genetic makeup and different rates of development. While the sensitive periods follow the general stages of human growth and maturation, scientific evidence shows that humans vary considerably in the magnitude and rate of their response to different training stimuli at all stages. For example, some athletes may show potential for excellence by age 11, whereas others may not show their potential until age 15 or 16.

These sensitive periods are sometimes referred to as "windows of trainability."

Figure 6: Sensitive Periods of Trainability



If Weightlifting athletes are to fulfill their genetic potential, correct training must be provided during the sensitive periods or “windows of optimal trainability” indicated in the diagram above. However, since the sensitive periods can vary between individuals according to their growth, maturation, and genetic predisposition, a long-term approach to athlete development is needed to ensure that individuals who respond slowly or late to training stimuli are not deprived of opportunities. In addition, measurement and monitoring should be used to determine each athlete’s Developmental age in line with the diagram above.

Again, all of the 10 Ss can be developed at any stage or age, but the sensitive periods provide the best opportunities for the greatest gains in the long-term development of the athlete.

1. Stamina (Endurance)

The sensitive period for training stamina occurs at the onset of Peak Height Velocity (PHV), commonly known as the adolescent growth spurt. Athletes need increased focus on aerobic capacity training as they enter PHV, and they should be progressively introduced to aerobic power as their growth rate decelerates.

Olympic Weightlifting requires two specific types of stamina. One type of endurance required is the ability to recover rapidly between sets of exercise. The second type of endurance is the ability to sustain brief high intensity actions over a long duration (i.e. training session or competition). Both types of endurance are optimally developed during puberty as the cardio-respiratory and muscular systems mature. Stamina is then maintained throughout the career of the Olympic Weightlifter.

2. Strength

Girls and boys have one sensitive period or «window» of trainability for strength, but they begin at different times. For boys, the sensitive period begins 12 to 18 months after PHV. For girls, the sensitive period begins with whichever of the following occurs first in the individual: menarche or the onset of Peak Weight Velocity (PWV). Some girls will experience PWV prior to menarche, while others will experience menarche prior to PWV.

In Olympic Weightlifting, two periods are emphasized in the development of strength and power. The first period for increasing strength is during puberty. Strength is proportional to the cross-sectional area of muscle (Sale 1988); therefore, increases in muscle mass during puberty

are essential for determining the maximum potential strength of the young Olympic Weightlifter.

In addition, Olympic Weightlifting requires greater absolute strength than other sports. Increasing strength post-puberty is therefore required for success in Olympic Weightlifting. Large increases in maximal strength may occur without increases in muscle mass (i.e. neural adaptations; Sale 1988). Olympic Weightlifting also requires explosive strength, which is also developed through neural adaptation. The optimal period for neural development of strength (maximal and explosive) occurs after cessation of growth of the musculoskeletal system (>17 years).

3. Speed

In both boys and girls, there are two sensitive periods or “windows” of trainability for speed. For girls, the first sensitive period occurs between ages 6-8 years, and the second occurs between 11-13 years. For boys, the first sensitive period occurs between ages 7-9 years, and the second occurs between 13-16 years. During the first sensitive period, training should focus on developing agility and quickness; during the second sensitive period, training should focus on developing the anaerobic alactic energy system.

Olympic Weightlifting requires a specific type of speed during loaded movement. While maximum speed during Olympic Weightlifting is high (angular velocities approach 500-1,000 O/s; Gourgoulis et al. 2002), these are low compared to other sports involving throwing and kicking motions (>3,000O/s; Matsuo et al. 2001). Olympic Weightlifting, however, requires high speed while interacting with a loaded object (barbell) that may exceed the body mass of the athlete. Olympic Weightlifting-specific speed is best developed concurrently with the development of Olympic Weightlifting technique. Therefore, the optimal window of trainability for Olympic Weightlifting-specific speed is during the acquisition of Olympic Weightlifting technique (11-14 years) and, like skill, is refined on a continual basis.

4. Skill

Girls and boys both have one sensitive period for optimal skill training. For girls, the sensitive period is between ages 8-11 years, while in boys it is 9-12 years – or more precisely, before the onset of the growth spurt/PHV (Learn to Train stage). During this period, young athletes should be developing physical literacy – that is, competence in the fundamental movement and sport skills that form the foundation of all sports.

⁵ Peak Height Velocity (PHV) is the maximum rate of growth during the adolescent growth spurt.

⁶ Peak weight velocity (PWV) is the maximum rate of growth in weight during the growth spurt.

Three periods can be identified for training Olympic Weightlifting skills: acquisition, refinement during growth, and refinement as an adult. Basic Olympic Weightlifting skills are best learned prior to the onset of the growth spurt/PHV. The basic elements of Olympic Weightlifting technique can be acquired within 1-2 years of training. However, refinement of Olympic Weightlifting technique is an ongoing process throughout the athlete's career. As the Olympic Weightlifter goes through the growth spurt, technique must be refined to match changes in the body's anthropometric proportions. Finally, as the Olympic Weightlifter reaches elite levels, where the focus shifts to development of strength and power, technique must be refined to match increases in strength and power.

5. Suppleness (Flexibility)

The sensitive period of trainability for suppleness occurs between ages 6-10 years in both girls and boys. However, attention to flexibility should continue during PHV and beyond to prevent injuries as muscle mass and height increase.

Development of suppleness prior to the growth spurt is important to allow the athlete to develop proper Olympic Weightlifting technique. During the growth spurt, continued flexibility training is important as increases in height may initially decrease flexibility. Suppleness should then be maintained throughout the Olympic Weightlifter's career.



SENSITIVE PERIODS AND “WINDOWS”

Note that the “windows” of trainability remain open throughout an athlete's career. All systems are always trainable. However, the “windows” are fully open during the sensitive periods of accelerated adaptation to training, and they are only partially open outside these sensitive periods.

6. (P)Psychology

Sport is a physical and mental challenge; maintaining high levels of concentration while remaining relaxed with the confidence to succeed is a skill essential to long-term performance in any sport. Possessing “mental toughness” while training and competing under extreme pressure and duress is especially important to success at the high performance level. At the same time, these mental skills can also enhance the individual's experience in everyday life.

There are three important elements in the psychological preparation of Olympic Weightlifters: fostering an appropriate motivational climate, building mental toughness, and developing discipline and commitment.

Sport psychologists have identified two features of motivational climates: goal-oriented and task-oriented. A goal-oriented climate emphasizes the end result of training. In weightlifting, a goal-oriented climate is easy to understand: the end result of training is to lift more weight. However, to achieve these goals, a task-oriented climate is required. A task-oriented climate emphasizes the training process. In Weightlifting this can range from development of proper technique to enjoying the challenges of training. A task-oriented climate is particularly important in the initial stages of LTAD while more focus can be placed on goal-orientation as the athlete becomes more competitive.

To develop mental toughness for success at elite levels, training programs must address the specific gender and LTAD stage of athletes. Training programs should include key mental components identified by sport psychologists: concentration, confidence, motivation, and handling pressure. As an athlete progresses through LTAD stages, mental training will evolve from: having fun and respecting opponents; to visualization and self-awareness; to goal setting, relaxation, and positive self-talk. To develop mastery, these basic skills are then tested in increasingly difficult competitive environments.

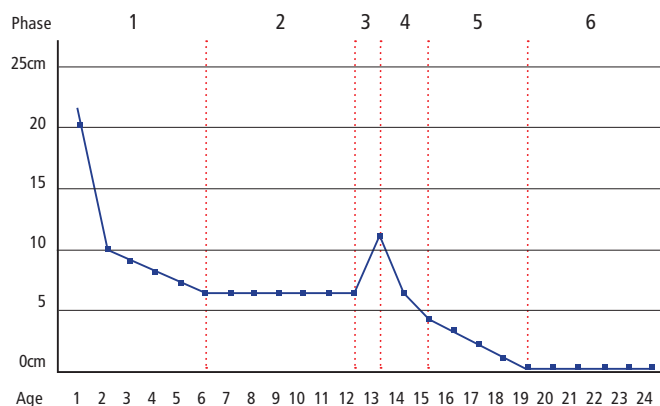
Above all else, Weightlifting training develops discipline and commitment. These are important traits beyond Weightlifting as they will prepare the athlete for success beyond their competitive career as well as promote the importance of physical fitness throughout the lifespan.

Ultimately, the planning, implementing, and refining of mental strategies for high-level competition will have a large impact on podium performances. Consequently, mental training is critical at all stages of LTAD as dealing with success and failure will impact athlete decisions to continue participating in the sport and physical activity in general, affecting both their active lifestyle and likelihood of podium performances.

7. Structure / Stature

This component describes the six phases of growth in the human body and links them to the sensitive periods or “windows” of optimal trainability. Stature (individual height) is measured before, during, and after maturation to track the developmental age of the athlete. By tracking developmental age, coaches can identify the sensitive periods of skill acquisition and physical development (stamina, strength, speed and suppleness) and adjust training programs accordingly.

Figure 7: Phases of Growth



Phase 1: Very rapid early growth, followed by rapid and then slow deceleration of growth until age 6.

Phase 2: Steady growth from age 6 until the onset of the growth spurt (GS).

Phase 3: Rapid growth until peak height velocity (PHV).

Phase 4: Rapid deceleration of growth.

Phase 5: Slow deceleration of growth.

Phase 6: Cessation of growth.

As stated above, suppleness training (flexibility) for Weightlifting athletes must be emphasized during the growth spurt. At PHV, stature increases rapidly, however, the suppleness of muscles may not increase proportionately, therefore coaches should continue to emphasize flexibility training.

Diagnostics to identify strength and weaknesses is critical to consider “structure” properly within training plans. For example, in Weightlifting, stature is related to body

mass. Taller individuals must have sufficient muscle mass to support their limb lengths, therefore training to increase muscle mass must be factored into the annual training plan.

8. Sustenance

Sustenance recognizes a broad range of components that serve the central purpose of replenishing the body, thereby preparing the athlete for the volume and intensity required for optimal training. Sustenance addresses several areas: nutrition, hydration, rest, sleep, and regeneration.

Each of these factors needs to be addressed differently depending on the LTAD stage. Underlying sustenance is the need for optimal recovery management: the athlete moves to a 24/7 model which places a high degree of importance on the athlete’s activities away from the training and competition environment.

The 24/7 model requires commitment and communication between the athlete and the coach, and often the parent as well. For proper sustenance and recovery management, the coach and/or parent must monitor the athlete’s recovery by identifying physical and mental changes which may contribute to athlete fatigue. Physical and mental challenges must be balanced by activities to promote regeneration. If this balance is not maintained, the athlete can experience burnout.

Of primary importance in Weightlifting is the need for proper nutrition and the correct timing of meals. The high training volumes and intensities, and the large muscle mass built through training, must be sustained through correct nourishment. Carbohydrates and fats are required to supply energy to working muscles, while protein is needed to build muscle. A proper dietary plan will also build good habits that promote healthy eating beyond the competitive years. The timing of meals is important as these nutrients must be available in the body for training and recovery.

9. Schooling

Each athlete’s school needs must be considered in the design of training and competition programs. Interference from other school sports should be minimized, and it is essential to have communication and cooperation between the different coaches who deliver training and competition programs.

In addition to school sports and physical education classes, academic loads and timing of exams must be taken into account. When possible, training sessions and competitions should complement, not conflict, with the timing of major academic events at school. Coaches should monitor potential overstress in their athletes

resulting from schooling, exams, peer groups, family, and boyfriend or girlfriend relationships, as well as increased training volume and intensities. A good balance needs to be established between all factors, and coaches and parents should work together to maintain the balance.

10. Socio-Cultural

The socio-cultural aspects of sport are significant and must be managed through proper planning. Athletes are socialized through their sport beginning at the community level, and eventually their participation can lead them to a diverse array of multicultural experiences if they pursue international competition. Managed correctly, these socio-cultural experiences can be valuable in broadening the social understanding of athletes, including their awareness of ethnicity, culture and national diversity.

Sport socialization also must address sport subculture to ensure general societal values and norms will be internalized via sport participation. As well, coaches and parents must guard against group dynamics which create a culture of abuse or bullying. Ethics training should be integrated into training and competition plans at all stages of LTAD.

As athletes begin travelling larger distances for competition, recovery periods might include education about the competition location, such as history, geography, architecture, cuisine, literature, music, and visual arts. With planning and foresight, Weightlifting can offer much more than a simple commute between hotel room and the competition venue: it can become a powerful means to develop socio-cultural awareness and enrich the lives of our athletes.

Socio-cultural activity is not a negative distraction or an interference with competition activities: it is a positive contribution to the development of the person and the athlete.

Other Considerations in Trainability

Children often enter Weightlifting after the sensitive periods of trainability have past. These individuals are therefore dependent on schools, recreation programs, and other sports to stimulate development of these capacities. LTAD recommends that Weightlifting clubs build relationships with these institutions and organizations to promote and support appropriate training. If athletes miss these sensitive periods of trainability, coaches will need to design individualized programs to remedy any shortcomings.





Christine Girard – 2008 Olympic Games (4th Place)

2. OLYMPIC WEIGHTLIFTING LTAD

The following LTAD stage descriptions for Olympic Weightlifting are based on international research linked to the Canadian LTAD model. In all of the Weightlifting LTAD stages, the first consideration is the athlete's Training age, second is Developmental age, and third is Chronological age. In the spirit of continuous improvement, the Weightlifting LTAD Work Group of CWFHC will continue to gather information and refine knowledge on the needs and demands for athlete training, competition and recovery at each of these stages.

Figure 8: LTAD Stages of Olympic Weightlifting

Training Age	LTAD Stage	Objectives	Chronological Age	
			Men	Women
0	Physical Literacy	Develop physical literacy and determination	0-10	0-9
1-2	Learn to Train	Acquisition of basic techniques/skills, easily manageable load progressions	10-13	9-12
3-5	Train to Train	Refinement of skills considering changes in body proportions as a result of maturation	13-17	12-16
5-8	Train to Compete	Accelerated development of strength and continuous refinement of skills	17-21	16-20
8-12	Learn to Win	Continued development of strength and stabilization of skills	21-25	20-25
12+	Train to Win	Maximize strength and skill mastery	25+	25+
Many	Lift for Life	Strong for Life	14+	13+

LEFT: The first two stages of the Weightlifting LTAD develop physical literacy for all athletes, regardless of their abilities or disabilities, and correspond to the ages prior to the adolescent growth spurt (PHV). Stages four, five, and six focus on developing excellence and correspond to PHV's onset and aftermath. Stage seven encourages lifelong physical activity, and athletes may choose to enter this stage at any time in their life (though ideally after the Learn to Train stage has been completed, so physical literacy has been established).

Training Age, Developmental Age, and Chronological Age

Training age is the primary focus in each of the LTAD stages for Olympic Weightlifters – developmental age and chronological age are secondary guides. For example, athletes might enter Weightlifting and begin acquiring basic technique at 10 years or at 14 years of chronological age, but their training age at point of entry is the same – zero years. Therefore, LTAD recognizes the need to individualize training programs based on Training age and Developmental age more than Chronological age.

In designing Weightlifting programs for specific athletes, there are several “ages” to consider:

- Training age, including general sport training age and Olympic Weightlifting age.
- Developmental age, as measured relative to Peak Height Velocity (PHV), otherwise known as the adolescent growth spurt. (Special care is taken to identify early, late, and average maturers.)
- Chronological age, measured as the number of years elapsed since birth.
- Skeletal age, measured according to the maturity of the skeleton determined by the degree of ossification of the bone structure.
- Mental age or a person’s mental ability expressed as the chronological age at which an average person reaches the same level of mental ability.

As Weightlifting proceeds with implementation of LTAD in Canada, annual periodized plans will be developed based on Training age. Those plans will then need to be adapted by individual Weightlifting coaches in consideration of the other “ages” of their athletes. Once adaptations are completed, coaches will have individualized training programs specific to the needs of each of athlete.

LTAD Rationale

As previously discussed, the Weightlifting LTAD pathway attempts to present a systematic approach to the delivery of all key facets of the sport. It is designed to maximize each participant’s potential and involvement in the sport by providing an overarching vision and a guide to programming content.

For young athletes prior to the Train to Train stage, this means the emphasis will be on physical literacy in a broad

base of fundamental movement skills and fundamental sport skills. “Training” will focus on learning the ABC’s of athleticism (Agility, Balance, Coordination and Speed) to teach young children how to control their bodies and to begin developing these important physical capacities. Children will participate in a variety of sports and activities that support the overall development of physical literacy.

At each subsequent stage, as individuals choose Weightlifting as their principal sport, they will be trained in the optimal systems and programs to maximize their potential as Weightlifting athletes and as long-term participants in sport.

Starting at the Train to Train stage, Weightlifting athletes will begin to specialize in Weightlifting and the ancillary capacities required for competition at the highest levels of the sport. Because Weightlifting is a late specialization sport, LTAD discourages early specialization (i.e. prior to the age of 10-14 years) since premature specialization contributes to imbalanced physical development, overuse injuries, early burnout, and inadequate development of fundamental movement and fundamental sport skills (see Specialization, discussed earlier).

VARIETY IS THE SPICE OF EARLY ATHLETE DEVELOPMENT

Celebrity athletes in many sports have attributed much of their success to having participated in different sports and activities at a young age, saying that the variety of physical activities gave them a wider base of athleticism and sports skills. LTAD encourages athletes to reach their maximum potential by training and enhancing all the athletic skills and capacities that will contribute to their success in the long term.



Stage Descriptions

The LTAD model is split into sequential stages in which Weightlifting athletes move from simple to more complex skills and from general sport skills to weightlifting-specific skills. The following pages set out recommended training sequences and skills development for participants from the Active Start stage (6 and under) to the Active for Life stage (adult participation and recreational competitive streams). Each LTAD stage description addresses the physical, mental, emotional and technical needs of the athlete as they pass through each stage of development.





Stage 1: Physical Literacy

Active Start and FUNdamentals

Chronological Age: males 0-10 years, females 0-9 years

Training Age: 0 years

OVERVIEW

Olympic Weightlifting is a late specialization sport, so we must depend on parents, other sports and physical education to prepare young children to be physically literate when reaching the age to begin our sport. Throughout the Physical Literacy stage, children should be learning fundamental movements and linking them together into play.

Active Start

males and females 0-6 years

Objectives

Active play is the way young children develop fundamental movement skills and experience their bodies. Children with disabilities may need extra encouragement to get involved in active play so they can develop their movement skills and acquire habits of lifelong activity.

Activities and games should provide fun and encourage participation, with emphasis on the development of fundamental movement skills and the ABCs. Physical activity should be fun and a part of the child's daily life, not something required. As an essential part of healthy child development, physical activity accomplishes the following:

- Enhances development of brain function, coordination, social skills, gross motor skills, emotions, leadership, and imagination.
- Helps children to build confidence and positive self-esteem.
- Helps to build strong bones and muscles, improves flexibility, develops good posture and balance, improves fitness, reduces stress, and improves sleep.
- Promotes healthy weight.
- Helps children learn to move skillfully and enjoy being active.

Total Activity Hours

- Provide 30-60 minutes a day of structured physical activity.
- Provide at least 60 minutes and up to several hours of unstructured physical activity or active play each day.
- Children this age should not be sedentary for more than 60 minutes a day (unless sleeping).
- Children should be engaged in play for a length of time suitable to their age and amount of other physical activities.

Where

- Home, playground, daycare, preschool and kindergarten.

Who

- Parents, caregivers and teachers.

FUNdamentals

males 6-10 years; females 6-9 years

Objectives

Learn all fundamental movement skills and build overall motor skills.

- Fundamental movement and fundamental sport skill development in the FUNdamentals stage should be well-structured, positive, and FUN!
- Children should participate in a variety of sports and physical activities.
- The first sensitive period of accelerated adaptation to speed occurs at ages 6 to 8 for girls and 7 to 9 for boys.
- Bypassing the specialized skill development in the FUNdamentals stage is detrimental to the child's future engagement in physical activity and sport.
- No periodization takes place; however, all programs are structured and monitored.
- If children later decide to leave the competitive stream, the skills they acquire during the FUNdamentals stage will benefit them when they engage in recreational activities, enhancing their quality of life and health.
- Children have increased strength and strength endurance due to nervous system development and coordination improvements.

- Resistance training can be used to teach weightlifting exercises as a type of skilled movement. (For example, squats and lunges are fundamental movement skills that can be taught through weightlifting. The use of a barbell further develops coordination and balance required to perform these movements.)

Total Activity Hours

- Participate in daily unstructured physical activity and play.
- Participate 1-2 times each week in a preferred sport (if one exists).
- Also participate in other sports 3 to 4 times a week.
- Children should be encouraged to compete with themselves to improve their own "personal best."

Where

- Clubs, schools and community recreation programs.

Who

- Club coaches, teachers and community recreation instructors.



Stage 2: Learn to Train

Chronological Age: males 10-13 years, females 9-12 years

Training Age: 1-2 years

OVERVIEW

Motor pathways in 9–13 year olds are very receptive to learning skills and technique. This is one of the most important stages of motor development. At this stage, children are developmentally ready to begin learning a range of sport-specific skills that will become increasingly refined at later LTAD stages. Children still participate in a variety of sports and physical activities.



Technical Objectives

- Focus on the development of basic Olympic Weightlifting techniques (classical lifts – Snatch, Clean and Jerk).
- Have athletes handle weights where they can realize success.
- Teaching should progress from simple to more complex exercises.
- Reinforce correct technique.
- Provide some challenge to the athlete but do not increase volume and intensity too quickly.

Tactical Objectives

- Proper warm-up before training or competition.
- Execution of predetermined attempts.

Physical Objectives

- Work on improving flexibility, coordination and stability (good positioning and body posture).
- Stick with the basic technical skills while working on general strength and conditioning (overall physical literacy).
- Overall physical development: aerobic/anaerobic systems, strength, power, speed, agility, flexibility, and muscular coordination.

Psychological Objectives

- Begin to develop athlete motivation, dedication, commitment and discipline in training and competition.
- Teach fair play and proper conduct with coaches, officials, and other athletes.
- Introduce basic concentration and relaxation exercises.

- Develop concentration (focus) and willpower to complete training tasks.
- Make all aspects of training and competition positive for the athlete.

Competition Objectives

- Introduce competition to the athlete.
- Competition can also assist coaches with identifying talent.
- Look at the possibility of developing a point system for club competitions where athletes are judged on their technique (technique before load) as well as result.
- Aim for continuous improvement of results.
- 4 – 6 competitions.

Other Sports

- Encourage athletes to participate in a wide range of sports.
- Athletes should continue to learn overall sports skills in a variety of sport environments.
- Develop speed, power, and endurance using games.

Training Volume

- Recommended 100–200 training hours per year.

Where

- Clubs, schools and community recreation programs.

Who

- Club coaches, teachers and community recreation instructors.
- Competition Introduction – Club Coach Certification.

Stage 3: Train to Train

Chronological Age: males 13-17 years, females 12-16 years

Training Age: 3-5 years

OVERVIEW

This is a critical stage for young athletes as they must refine their technique to accommodate changes with puberty (i.e. growth spurt). Aspiring weightlifters should begin to specialize at this stage, as an increase in the volume of the competition lifts is required to achieve technical perfection. With the growth spurt, athletes will have a greater capacity for developing strength and endurance.



Technical Objectives

- Stress the acquisition of good technique for future specialization.
- Refinement of skills considering changes in body proportions as a result of maturation.
- Develop the perception of correct technical performance.
- Technical preparation: Achieve technique perfection; continuously refine the lifts focusing on proper posture, speed of movement, and reception (receiving weight in the bottom position).
- Exercises for General and Specific training.
- Gradually increase the amount of technical exercises pertaining to Olympic Weightlifting.

Tactical Objectives

- Practical application of strictly planned attempts.

Physical Objectives

- Overall physical development: Strength of the main muscle groups, speed in conjunction with strength, specific flexibility, strength endurance, specific coordination.
- Develop working capacity through general and multilateral physical preparation.
- Improve flexibility, coordination, and aerobic endurance, thereby building the basis of Speed and Strength development.
- Exercises to improve flexibility and coordination.
- Exercises to develop aerobic endurance specific to Olympic Weightlifting.
- Growth and development must be carefully monitored.

Psychological Objectives

- Improve focus (emotional and mental preparedness).
- Structured short- and long-term training programs.
- Develop narrow and intense concentration, visualization, muscular relaxation.

Competition Objectives

- Participate in selected competitions according to individual levels of performance.
- Increase sport results during the competition season.
- Peak for main event.
- 6 – 8 competitions.

Other Sports

- Encourage athletes to participate in 1-2 other sports for the benefits of cross-training, fitness, and enjoyment.

Training Volume

- Recommended increase volume of training hours to 200–400 hours per year.

Where

- Clubs, schools and community recreation programs.

Who

- Club coaches, teachers and community recreation instructors.
- Competition Introduction – Club Coach Certification.

Stage 4: Train to Compete

Chronological Age: males 17-21 years, females 16-20 years
Training Age: 5-8 years



OVERVIEW

This is the most important phase of training for Junior Weightlifters who are aiming for high-performance competition. Athletes must develop their work capacity to sustain the high frequency of training required in this stage (daily, and possibly twice daily). More competitions should be added to the competition schedule, particularly national and international competitions, to develop the psychology to perform in pressure situations.

Technical Objectives

- Perfect technique through continuous refinement of skills.
- Continuously refine the lifts focusing on the proper posture, speed of movement, and reception (receiving weight in the bottom position).
- Improve motor abilities which are dominant within the sport.
- Perfect technique of the Competitive lifts (Snatch and Clean & Jerk).

Tactical Objectives

- Practical application of strictly planned attempts.

Physical Objectives

- Harmonious development of the whole body with great emphasis being placed on areas which will ensure a high level of efficiency in Olympic Weightlifting.
- Accelerated development of strength.
- Strength of the main muscle groups and strength endurance.
- Speed in conjunction with strength.
- Specific flexibility and specific coordination.
- Increase both volume and intensity in training while avoiding overtraining.

Psychological Objectives

- Develop narrow and intense concentration, visualization, muscular relaxation.
- Develop psychological abilities of the athletes to better prepare them for stressful training and intense competitions.

Competition Objectives

- Increase sport result during the competition season.
- Peak for main event.
- Develop long-term plans for individual success.
- 6 – 8 competitions.

Other Sports

- Athletes have specialized in Olympic Weightlifting.

Training Volume

- Recommended increase volume of training hours to 400–600 hours per year.

Where

- Clubs and Provincial programs.

Who

- Provincial coaches.
- Competition Development certification.



POWER
Athletic Flexibility
Commitment
FOCUS Speed
Strength
Explosive
POWER
Flexibility
Commitment
Need
Athlete
Coach

LEARN TO WIN

Stage 5: Learn to Win

Chronological Age: males 21-25 years, females 20-25 years

Training Age: 8-12 years

OVERVIEW

At this advanced stage, the training and competition environments must be elite calibre. Athletes should be training around other elite weightlifters, and there should be regularly scheduled training camps and regular competition at major events. Specialized athlete support becomes essential to optimizing performance, including sport scientists, nutritionists, massage therapists, physiotherapists and others on an Integrated Support Team (IST).



Technical Objectives

- Develop individual style.
- Continued refinement and stabilization of skills.

Tactical Objectives

- Prepare to perform pre-planned strategies and attempts.

Physical Objectives

- Continue to maximize strength of the main muscle groups, speed in conjunction with strength, power endurance, and neuromuscular coordination.

Psychological Objectives

- Perform in highly competitive situations under pressure.

Competition Objectives

- Maximize competition results.
- Peak for main events.
- Break competition records (Provincial, National, and International).
- 4 – 6 competitions (2-3 International events).

Other Sports

- Athletes have specialized in Olympic Weightlifting.

Training Volume

- Progressively increase volume of training hours to 600–800 hours per year.

Where

- Provincial and National Training Programs.

Who

- Provincial coaches and High Performance/National coaches.
- Competition Development certification and Competition High Performance certification.



POWER
Athletic Flexibility
Commitment
FOCUS Speed
Strength
Explosive
POWER
Flexibility
Commitment
Need
Athlete
Coach



Stage 6: Train to Win

Chronological Age: males and females 25+ years

Training Age: 12+ years

OVERVIEW

All of the athlete's physical, technical, tactical (including decision-making skills), mental, personal and lifestyle capacities are fully established with the focus of training shifting to maximizing performance. Athletes become ambassadors of the sport and role models for other weightlifting athletes.



Technical Objectives

- Develop individual style.
- Refinement and mastery of technical skills through continuous work.

Tactical Objectives

- Prepare to perform pre-planned strategies and attempts.
- Athletes along with their Coaches should have an IST (Integrated Support Team) in place to assist with preparation and recovery.

Physical Objectives

- Continue to maximize strength of the main muscle groups, speed in conjunction with strength, power endurance, and neuromuscular coordination.
- Efficient preparatory and recovery work.
- Train athletes to peak for major competitions.
- Ensure rest and recovery.

Psychological Objectives

- Perform in highly competitive situations under pressure.
- Mental and life skills should be at the highest level to be able to cope with all stresses in and out of competition and training.
- Ensure a healthy lifestyle and ethical participation.

Competition Objectives

- Maximize competition results.
- Peak for main events.
- Break competition records (Provincial, National, and International).
- Podium performances.
- 3 – 5 competitions (1 - 2 International events).

Other Sports

- Athletes have specialized in Olympic Weightlifting.
- Highest degree of specialization at this stage.

Training Volume

- Progressively increase volume of training hours to 800–1000 hours per year.
- Athletes are committed to excellence and their training program reflects this.

Where

- National Training Programs.

Who

- High Performance/National coaches.
- Competition High Performance certification.

Stage 7: Lift for Life

Chronological Age: any age males and females
(after developing physical literacy)

Training Age: any

OVERVIEW

Lift for Life includes participants of any age who enjoy Olympic Weightlifting in a non-competitive setting, or recreational lifters who enjoy competing for fun. It also includes athletes competing in Masters events at the Provincial, National or International level.

It is key that weightlifting athletes have a positive experience in the sport, so they can transition to other roles after they leave the competitive stream (coach, official, volunteer, or sport leader).



Technical, Tactical and Physical Objectives

- Maintain physical abilities and skills while having fun.

Psychological Objectives

- Lifelong enjoyment of Olympic Weightlifting.
- Respect for themselves, others and the sport of Olympic Weightlifting.

Competition Objectives

- Move from high-performance competition to lifelong competitive sport through age group competition such as Master's World Championships/Games.
- 2 – 3 competitions.

Other Sports

- Active participation in Olympic Weightlifting and other sports.

Training Volume

- According to the goals and interests of the individual.

Where

- Clubs and community recreation programs.

Who

- Club coaches and community recreation instructors.



*Alexis Demers-Marcil – 2003
World Championships*

World Weightlifting Championships VANCOUVER 2003



CANADA HOSTS THE WORLD

Canada has hosted a number of world-class weightlifting events:

- Olympic Games (Montreal 1976).
- Pan American Games (Winnipeg 1967 & 1999).
- Commonwealth Games (Vancouver 1954, Edmonton 1978, Victoria 1994).
- 2003 World Senior Weightlifting Championships (Vancouver).
- 2000 World University/College Weightlifting Championships (Montreal).
- 1980 World Junior Weightlifting Championships (Montreal).

3. LTAD COMPETITION REVIEW

Competition plays a critical role in the development of our Weightlifting athletes. How we define the role and scope of competition at each LTAD stage will impact the development of their skills and capacities – physical, mental and emotional. The Olympic Weightlifting LTAD provides the following recommendations for scheduling and designing competition at each LTAD stage.

Training to Competition Ratios

The ratio of time spent in training to the amount of time spent competing should be adjusted according to the age of the athlete, their stage of maturation, and the number of years they have been Weightlifting (i.e. training age). For example, younger athletes and athletes with less experience should spend more hours in training to develop skills and physical capacities and much less time in formal competition.

As athletes progress towards the end of the competitive pathway, at stages such as Train to Compete and Train to

Win, they should be competing more in order to maximize the adaptation of their skills and other capacities to actual competition settings.

Periodization

As mentioned earlier, athlete training, competition and recovery should be guided by periodized plans at each LTAD stage. Periodization allows for cyclical tapering and peaking in training and competition so athletes do not burn out physically or mentally. Periodized plans will look different at each stage, according to the physical and mental maturation of the athletes, as well as their training age in Olympic Weightlifting.

An annual periodized training plan is divided into macro cycles (Stone et al. 1981). Each macrocycle is typically 8-16 weeks long and serves one major competition. Each macrocycle is further divided into mesocycles (typically 1 month each) which identify the focus of training during that time. Mesocycles are divided into microcycles, or

individual weeks of training. (For more information on periodization, please refer to Training Periodization for the Olympic Weightlifter, available on the CWFHC website at www.canadianweightlifting.ca.)

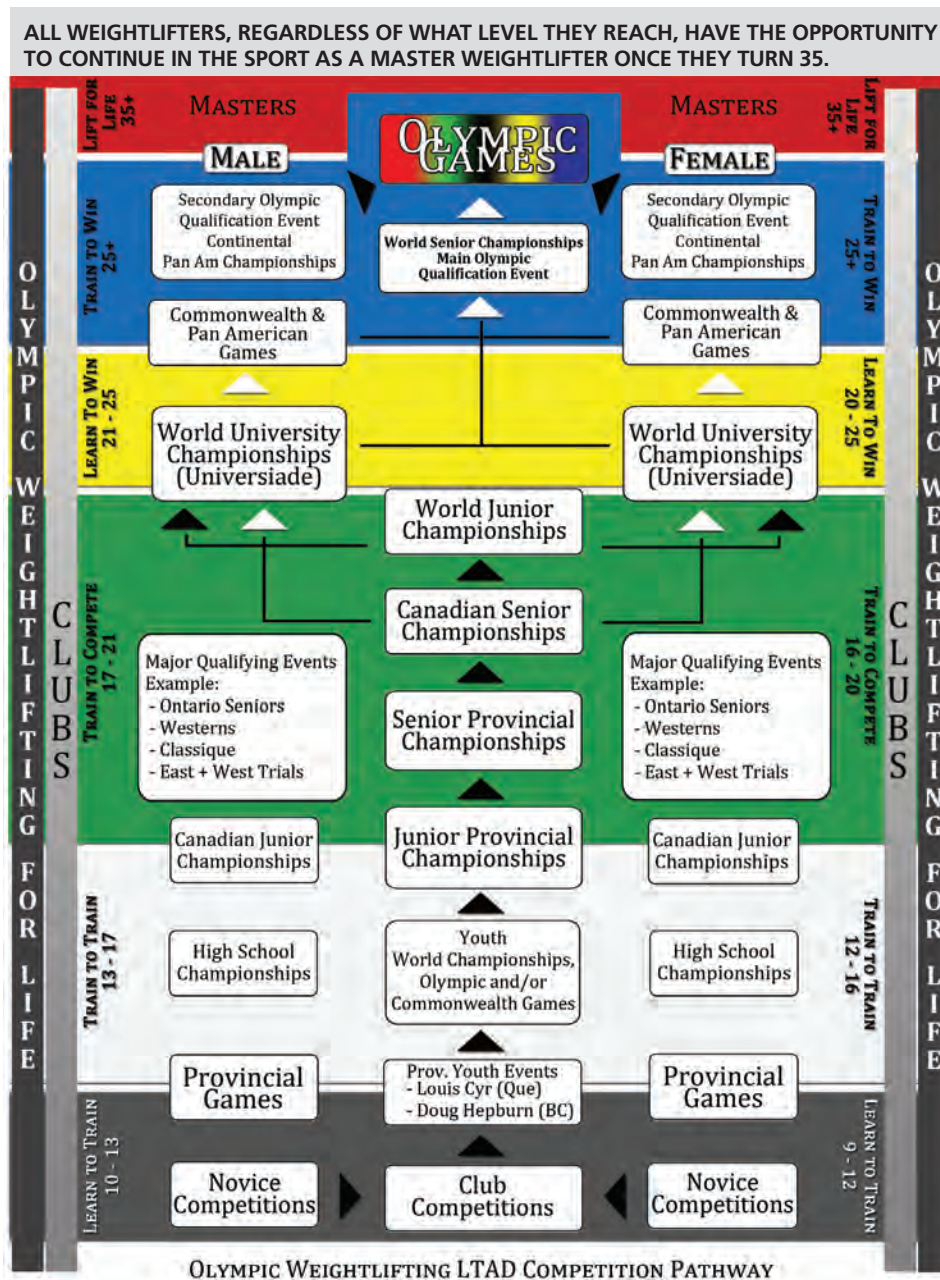
For example, it is more appropriate to host regional competitions at certain ages and stages over National or Provincial/Territorial events, as travel and accommodation costs quickly become a barrier for many developing athletes.

Competition Structure

Competition events for Weightlifting should respect the physical and mental maturation of our athletes at each stage, and they should also pay heed to challenges for athlete travel and accommodation whenever possible.

It is also important that competition events fit with periodization plans. For example, it might not be useful or appropriate for a Weightlifting athlete to attend a particular competition simply because they are “good enough” or qualified – it is conceivable that other factors in their development or training stage may dictate that it would be better to skip the competition or attend another.

Figure 9: Weightlifting LTAD Competition Pathway



CWFHC Classification System

In reviewing the design of Weightlifting competition in Canada, we need to examine existing approaches to classification of Weightlifting athletes. We need to identify those aspects that work for the Canadian system, those that can be adapted to fit, and those which are unsuitable for our purposes and must be discarded. The aim is to create a package that is designed to address our unique circumstances in Canada. The following are comments and recommendations to advance the competition structure and classification system in our Canadian context.

One approach involves the “classification system” first employed by the Soviet Union to identify performance standards for their athletes. Canadian Weightlifting has developed its own Canadian classification system by recognizing the value and versatility of this system as a tool to assist in athlete classifications, rankings, team selections, funding considerations, and program adjustments. The Canadian system employs many of the components of the Soviet system, but it also recognizes the unique circumstances facing the sport in this country and meshes the program with the existing Canadian “marker” system. We only need to marry the classification system to the various LTAD stages.

Figure 10: Weightlifting LTAD Classification and Competition Structure

Training Age	CWFHC	LTAD Stage	Level of Competition	Chronological Age	
	Classification			Men	Women
0		Physical Literacy	Physical fitness testing No formal competition	0-10	0-9
1-2	Novice Class	Learn to Train	Skills & Novice competitions	10-13	9-12
3-5	Provincial Class I-IV	Train to Train	Juvenile, Junior, Provincial Events	13-17	12-16
5-8	National Class	Train to Compete	Junior, Senior, & International B Events	17-21	16-20
8-12	International Class I-IV	Learn to Win	Senior, International A & B Events	21-25	20-25
12+	Int. Elite World Class World Elite	Train to Win	Senior, International A & B Events	25+	25+
Many		Lift for Life	Masters Competition	14+	13+



To create the correct linkages with LTAD, it is necessary to consider the wide variation in the rate of maturation among young athletes, both physiologically and within their chosen sports.

L.S. Dvorkin in *The Young Weightlifter* cites data collected on future Soviet Masters of Sport that indicates a wide variation in performance by the end of the first two years of training (a period roughly equivalent to the LTAD Learn to Train stage).

While the majority of these athletes achieved Class III (Canadian Provincial IV) [61.8%] and Class II (Canadian Provincial III) [30.9 %], 2.9 % were equivalent to Canadian Novice, 2.9 % fell between Provincial II and I, and 1.5 % achieved Canadian National Class.

This would suggest that within the Canadian Classification system, a realistic goal for our athletes at the completion of the Learn to Train stage would be at least Provincial Class IV or better.

During the three-year Train to Train stage, it would be expected that the majority of Canadian lifters would progress from Provincial III through Provincial II to Provincial I, with the more gifted athletes reaching National Class or beyond.

The Train to Compete stage should produce three additional years of progress, with the athletes achieving National Class and graduating into the International Classifications.

The objective of the next four years, or the Learn to Win stage, is to see the lifters striving to achieve at least International Class I, since national funding commences at this point.

Once the athlete moves into the Train to Win stage, the objective is to move through the “International Elite” classification and into the “World Class” and “World Elite” classifications, thereby achieving international competitiveness. It is possible to maintain this level of performance for an extended period of time depending on the athlete’s age, health, fitness level, and life commitments.

Beyond their competitive careers, it is becoming more common for athletes to continue their sporting activities into the Active for Life stage (called Lift for Life within the Weightlifting LTAD).

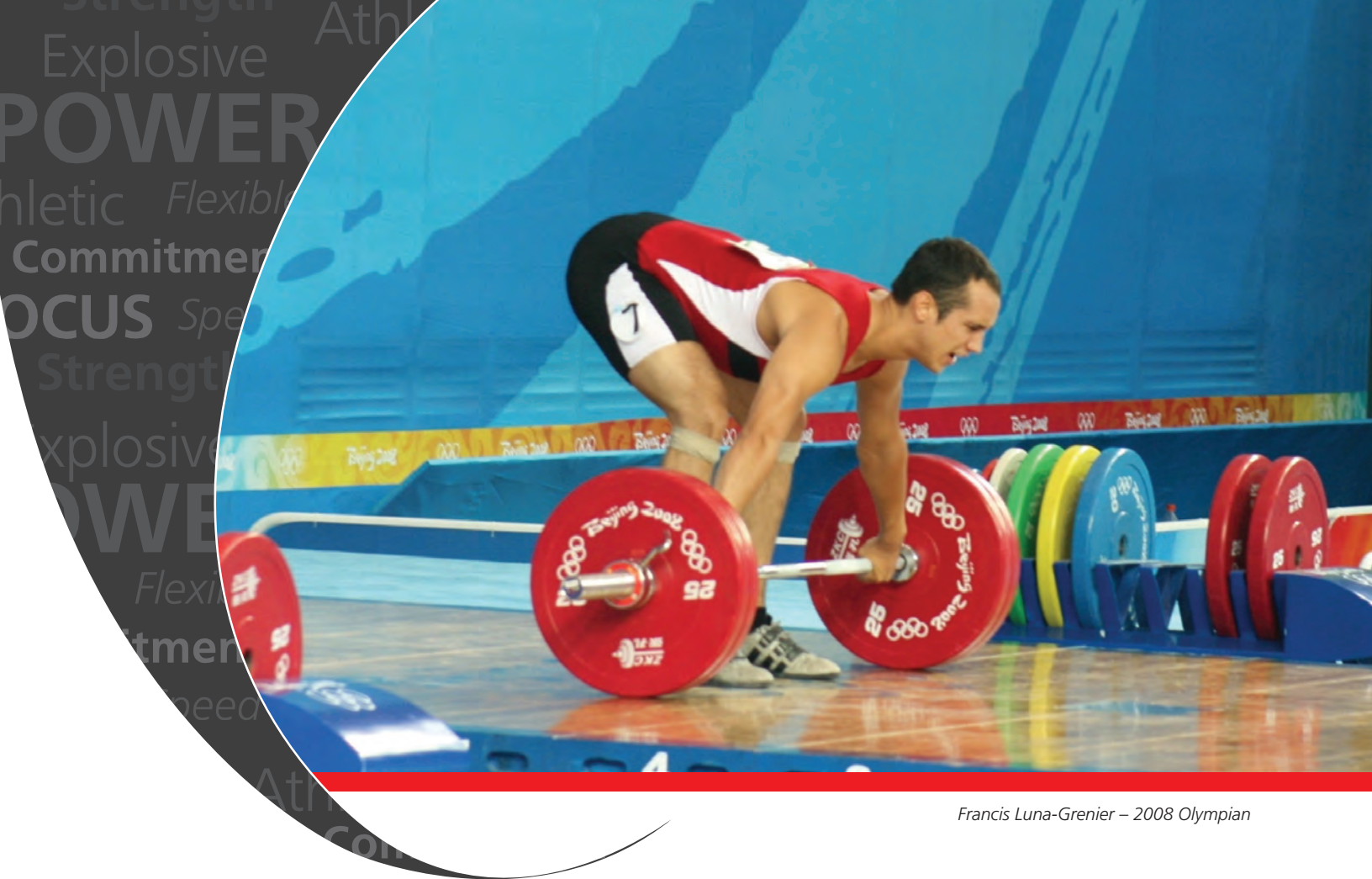
This continuation in lifelong activity has been facilitated by the enormous growth of “Masters” activities in all sports, including Weightlifting, at Provincial, National, and International levels. There are even World Masters Games/Championships.

Recognizing that the Marker system is updated on a yearly basis due to data collected and Markers being re-calculated, the CWFHC Classification will only be updated every quadrennial (Olympic cycle). The CWFHC Classification system can be used for the following:

- To recognize achievement when athletes improve to the next level (Provincially and Nationally).
- To establish Provincial qualifying totals for events and funding support to National/International events.
- To establish National qualifying totals per quadrennial (presently 65% of Marker).
- To establish an athlete’s eligibility for funding according to the minimum standard for AAP of 85%.







Francis Luna-Grenier – 2008 Olympian

4. LTAD IMPLEMENTATION PLAN

Based on a critical review of the sport of Olympic Weightlifting in Canada, and based on the requirements of the LTAD pathway, we need to take strategic action to improve our sport. LTAD relies on coaches, leaders, clubs, associations, facilities and communications throughout the integrated “sport system” of Olympic Weightlifting. It also requires the understanding and support of parents, caregivers, teachers, health practitioners and sponsoring agencies.

Through the implementation of LTAD, the CWFHC aims to achieve three main goals:

1. Positively affect all those who are using strength training to be fit for life.
2. Positively affect the development of performance in all sports.
3. Develop Olympic Champions in Olympic Weightlifting.

Six Key Areas

To achieve these goals, the LTAD Committee has identified six key areas that need to be addressed within the Weightlifting sport system:

1. Athlete Training and Development
2. Coaching
3. Capacity and Leadership
4. Competition
5. Facilities
6. Communications

To reach our goals, we need to align the activities and influence of all of our stakeholders in these areas with the needs of the Weightlifting athlete at each stage of LTAD.

1. Athlete Training and Development

The Olympic Weightlifting LTAD pathway has been designed to address the major issues in training and competition that affect the development of our Weightlifting athletes (see Chapter 2). In addition to the pathway, the following goals and objectives needed to be addressed in remedying other issues around athlete training and development.

Athlete Training and Development Issues

- Lack of a logical development pathway from entry level to high performance and athlete retention.
- Many training programs are not based on developmental age.
- Training programs do not exploit the sensitive periods of optimal trainability.
- Lack of entry level programs to recruit new Weightlifting athletes.

Implementation Goals and Objectives for Athlete Training

- Create an integrated training system based on LTAD that develops broad-based athletic skills and performance.
 - Create pathways between feeder clubs and elite levels of the sport.
 - Disseminate knowledge of the sensitive periods of trainability and the importance of considering developmental age in program design.
- Increase appropriate use of Olympic Weightlifting in testing and measurement.
 - Show other sports how to use Olympic Lifts (i.e. Power Clean, Squat, etc.) as tools to test and measure Strength and Power (training camp/team selection).
 - Demonstrate how Olympic Lifts can help in talent ID, improving athlete performance, and measuring how the Olympic Lifts have improved athlete sport performance (e.g. improved vertical jump, etc.).
- Broaden the base of participation.
 - Recruit youth into Olympic Weightlifting.
 - Establish Olympic Weightlifting Courses as part of post secondary education curriculum.
 - Develop High School Olympic Weightlifting programs modeled after Le Magdelaine Secondary in LaPrairie, Quebec.
 - Re-introduce a High School Power Clean Event/Program to promote youth being introduced to Olympic Weightlifting (This can also assist with early talent ID).
 - Establish a National program of “External Course Credits” for high school students as accomplished Athletes, Coaches, Officials and Volunteers (courses plus practical work) in the

sport of Olympic Weightlifting.

- Develop a “Sport Participation Development Program” to increase grassroots development (Sport Canada Funded – e.g. Run, Jump, Throw for Athletics).
- Retain our Weightlifting athletes in the sport for the long term.
 - Provide health insurance coverage to those top level athletes who are not covered (x number of athletes).
 - Broaden the base of support of top weightlifters in Canada (i.e. increase the number of Sport Canada AAP Cards to include the full National Team).
 - Develop a plan of support for athletes outside of the Sport Canada Athlete Assistance Program where perhaps a sliding scale of support can be obtained for a National B Team (15 athletes) and a National Junior Team (15 athletes).
 - Develop incentives/recognition for Athletes/Coaches/Officials which in turn will assist in overall retention of active members in the sport.



Olympic Weightlifting increases vertical jump

2. Coaching

Canadian Weightlifters require excellent coaching at all levels of LTAD if they are to progress in the sport and achieve podium performances. However, there are currently many challenges facing the coaching development system in Canada. As with athlete development, development of our Weightlifting coaches should be viewed as a long-term process that supports our coaches' entire careers.

Coaching Issues

- Limited number of qualified coaches with little direction at the National level.
- Few training opportunities to develop quality coaches at all levels (NCCP+).
- Few professional development opportunities to enhance coaches' abilities and to maintain certification.
- Coaches lack up-to-date resources to assist them in athlete and club development.
- Coaches lack knowledge of technical skills and/or wait too long to teach specific skills.
- Coaches lack experience in applying their knowledge.
- Coaches create "one size fits all" training programs at the club level.
- Personal trainers take an NCCP Technical Course and then advertise themselves as certified coaches in Olympic Weightlifting. (Our sport needs to take ownership of coach education.)
- Weightlifting coaching is not recognized as a profession.

Implementation Goals and Objectives for Coaching

- Establish an efficient coaching certification process and actively promote coach development.
 - Develop a Long-Term Coaching Development Plan for Weightlifting.
 - Review and revise NCCP program for certifying Weightlifting coaches.
 - Integrate LTAD fully with NCCP so that information and messaging is consistent (LTCD – Long Term Coaching Development).
 - Use National events and camps as educational opportunities for coaches (Professional Development).
 - Apply scientific research and innovation to enhance coach development.
- Communicate and support best practices in coaching at all levels of Weightlifting.
 - Produce coaching manuals for each LTAD stage.
 - Produce monitoring guidelines for coaches to track the development of their athletes.
 - Create protocols for testing athlete performance.
 - Establish guidelines for athlete Talent identification.
 - Create procedures and protocols for athlete data collection and record keeping.
- Create a system for coach recruitment and retention.
 - Identify coaching pathways between elite levels of our sport and feeder clubs.
 - Create clear guidelines for athletes to transition from the Train to Win stage to various roles in the Active for Life stage (e.g. coaching,

officiating, and organizational leadership).

- Establish a transitional pathway for Weightlifting athletes to become coaches.
- Promote links between programs at all levels (Club, PSO, and NSO) for shared resources and program synergies.
- Recruit and train our coaches as Strength & Conditioning specialists.
- Develop coaching leadership and expertise at the National level.
 - Establish a National Coaching Representative and/or Committee.
 - Identify a National Coach.

Coaching Pathway

In light of the Coaching issues in Weightlifting, the CWFHC has developed the Coaching Pathway to align with the stages of LTAD. The following chart outlines the sequential steps of the new Pathway.

Figure 11: Weightlifting Coaching Pathway

Training Age	LTAD Stage	New NCCP	Chronological Age	
			Men	Women
0	Physical Literacy		0-10	0-9
1-2	Learn to Train	Club Coach/Comp Intro	10-13	9-12
3-5	Train to Train	Club Coach/Comp Intro	13-17	12-16
5-8	Train to Compete	Provincial Coach/Comp Development	17-21	16-20
8-12	Learn to Win	Provincial (Comp Dev)/High Performance (Comp HP) Coach	21-25	20-25
12+	Train to Win	High Performance Coach/Comp HP	25+	25+
Many	Lift for Life	Club Coach	14+	13+

Competition Introduction (Comp Intro) – Club Coach
 Competition Development (Comp Dev) – Provincial Coach
 Competition High Performance (Comp HP) – High Performance/National Coach

Certification Requirements

All certifications including identified criteria would be beneficial at all stages of LTAD, but the CWFHC recognizes that not all coaches have aspirations to become High Performance Coaches. In some of the most successful competitive Weightlifting countries (e.g. China), we find that the head coach in each club is trained and expected to develop Weightlifters from the grassroots to the International level of competition.

In Canada, we need to establish similar coaching norms and minimum standards if we want to see our sport develop

and our athletes succeed. We can consider a range of requirements to become an Olympic Weightlifting coach:

- Experience as an Olympic Weightlifting athlete.
- Mentoring under an experienced Olympic Weightlifting coach.
- Demonstrated proficiency in the coaching and development of athletes at the junior level (e.g. the athletes demonstrating proper technique).
- Completion of a sport science degree can be beneficial.
- Overall training as Strength and Conditioning specialists.

With a sound coaching pathway firmly established, other considerations for the development of our Weightlifting athletes would include establishing clear processes for talent identification and performance testing, together with procedures and protocols for athlete data collection.

To achieve the goals of coaching development, Canadian experts in the sport of Olympic Weightlifting will need to work together to integrate LTAD with NCCP. Cooperation will also be required to establish the processes for talent identification and regular athlete monitoring.

3. Capacity and Leadership

One of the keys to future development of Olympic Weightlifting in Canada would be access to additional or new funding to establish a National office and staff for the Canadian Weightlifting Federation (CWFHC). A permanent CWFHC office and paid staff would allow the CWFHC to focus on key areas of development within the Federation. The CWFHC Executive Board could begin to identify key individuals to take on significant roles to assist in its overall development (e.g. Coaching, Officials, Sponsorship/Marketing, Communications).

Capacity and Leadership Issues

- Weightlifting is supported by very limited funding, with few funding sources.
- Funding for Weightlifting is sporadic and intermittent (sustainability).
- Leadership and governance lacks accountability and direction.
- Leadership succession at the National and Provincial level is ad hoc, leading to organizational instability.

Implementation Goals and Objectives for Capacity and Leadership

- Develop funding sources and improve funding sustainability.
 - Establish a Sports Participation Development Program which can be supported by Sport Canada and other potential funding groups (e.g. Athletics – Run, Jump, Throw; Figure Skating – CanSkate; Snowboarding – RBC Riders).

- Create links between all levels of programming (Club, PSO, and NSO) to maximize sharing of resources and to create cost-efficiencies through program synergies.
- Identify new funding partners and sponsorships.
- Establish accountability in leadership and direction in governance.
 - Create accountability guidelines for leadership roles.
 - Write governance procedures and protocols at all levels of Weightlifting – Club, Provincial, National.
- Plan for leadership succession and organizational stability.
 - Develop procedures for leadership succession.

4. Competition

Competition plays a central role in the development of our high-performance athletes. To progress as competitive athletes, Canadian Weightlifters need a rational system of competition and athlete classification that respects their developmental needs, their maturation, and the demands of competition schedules (see Chapter 3).

Competition Issues

- No pathway is identified for athlete progression in competition.
- Competition schedule is not aligned with international competition calendars.
- Competition calendars are not aligned between Provincial Associations.
- Competition formats have not considered the wide variation in the rate of maturation in young athletes.
- Systems for athlete classification are inconsistent.
- Periodized plans have not been used to guide athlete training, competition and recovery.

Implementation Goals and Objectives for Competition

- Align Canadian competition schedules (Club, Provincial, National) with the international calendar.
 - Adjust competition schedules to match the age of the athlete, their stage of maturation, and the number of years they have been Weightlifting (i.e. training age).
 - Align different levels of competition with international competitions and calendars.
 - Coordinate calendars between all of the Provincial associations (encourage Provinces to have similar age group competitions – e.g. Youth, High School, etc.).
- Create a competition and classification system that respects the wide variation in the rate of maturation among young athletes, both physiologically and within their chosen sports.
 - Establish the competition progression chart

for different levels of our athletes (i.e. Classification Chart).

- Review existing approaches to classification of Weightlifting athletes.
- Identify features of classification systems that work for the Canadian system, those that can be adapted to fit, and those which are unsuitable for our purposes and must be discarded.
- Create periodized plans to guide athlete training, competition and recovery.
 - Incorporate planning for cyclical tapering and peaking in training and competition so athletes do not burn out physically or mentally.



Marilou Dozois-Prevost – 2008 Olympian

5. Facilities

An important key to developing Canadian Weightlifters is establishing consistent access to quality training facilities for athletes at all levels of the LTAD pathway. Access to facilities is very inconsistent across Canada for our youth athletes entering the sport, and our high performance athletes are not served by a comprehensive system of dedicated training centres. In some instances, the CWFHC can partner with other sports to create shared use of suitable training facilities and equipment. In the case of creating training facilities dedicated exclusively to Olympic Weightlifting, the CWFHC must rely on larger sport funding agencies to recognize the importance of Olympic Weightlifting and build these new facilities, as funding does not exist within the CWFHC.

Facilities Issues

- Limited access to weightlifting training facilities.
- Few partnerships with other sport organizations.
- Lack of Club, Provincial, Regional, National Training Centre(s).
- Inadequate space allocated to Olympic Weightlifting in Sport Schools (potential to become part of the club system in Canada) and other existing sport training facilities.

Implementation Goals and Objectives for Facilities

- Create access to weightlifting training facilities.
 - Develop new facilities and secure access to existing facilities.
 - Create partnerships with other sport organizations to develop adequate (high quality) weight training facilities.
 - Become a leader in the future development of High Performance Training facilities for all sports throughout Canada.
- Establish Club, Provincial, Regional, and National Training Centre(s).
 - Identify logical facilities/hosts for training centres, and secure funding to maintain these centres (rent, lease, staff).
- Increase space in sport schools for training in Olympic Weightlifting.
 - Add Olympic Weightlifting to University/College Strength & Conditioning Programs.
 - Include Olympic Weightlifting education in curriculum of future Physical Educators (pilot project).

6. Communications

In promoting the development and growth of Weightlifting within the Canadian sport system, we must make concerted efforts to communicate with our key audiences. Weightlifting currently has a very low profile in the Canadian sporting landscape, and the public holds many negative beliefs about the sport. We need to educate athletes, coaches, parents, educators, club administrators and other stakeholders about the benefits of Weightlifting as a sport.

Communication Issues: *Getting the word out*

- The public has many negative beliefs and myths about Weightlifting.
- Canadians are largely unaware of the success of our National athletes (e.g. Women's success).
- People are not aware that Weightlifting provides sport opportunities for all ages, not just the young (e.g. Masters Competition – "sport for all").
- Weightlifting has a very low profile in Canada, and it is not attracting youth to participate.
- The benefits of the Olympic Lifts remain largely unrecognized for improving performance in other sports.



Implementation Goals and Objectives for Communication

- Reposition Weightlifting and (CWFHC) within the Canadian sport community.
 - Encourage all PSOs to fully develop their websites and for PSOs to encourage the development of Weightlifting Club websites so that the sport of Olympic Weightlifting becomes more visible over the internet.
 - Develop comprehensive and accurate

information on the sport of Olympic Weightlifting for the SportFit program; expose more youth to the sport.

- Create a strong new image of Olympic Weightlifting within Canada.
 - Increase exposure of the sport through media.
 - Recognize and promote the international success of our female Weightlifting athletes.
 - Create an image for Weightlifting that makes it a “cool” sport for youth to get involved in.
 - Promote Weightlifting as a “sport for all” and a suitable choice for lifelong activity, including opportunities to compete at the Masters level.
 - Promote the fact that all ages and body types can be Olympic Weightlifters.
 - Communicate the values of Olympic Weightlifting in Fitness Training, Sport Performance Training, and Rehabilitation Training.
- **Promote the benefits of the Olympic Lifts for improving performance in other sports.**
 - Create promotional materials that describe the clear benefits of using Olympic Weightlifting movements to develop **explosive power** specific to other sports, making the Olympic Lifts foundational to all sport training.
 - Develop strong ties/relationships with organizations which can directly support the development/exposure of Olympic Weightlifting in Canada (e.g. National Sport Programs - Rugby, Crossfit, Sport Conditioning/Training Facilities, and University Sport Programs).



Bert Squires – 1984 Olympian

OTHER SPORTS BENEFIT FROM OLYMPIC WEIGHTLIFTING TRAINING

Olympic Weightlifting coaches have been hired to work with players and prospects for the National Rugby Team so they learn to lift correctly and more often, and they can arrive at the Rugby program stronger and more powerful than ever. If adequate training facilities were available across Canada, similar partnerships could be developed with other sports such as ice hockey, football, wrestling and athletics to improve athlete performance.



Crossfit supports the development of Olympic Weightlifting





SUMMARY

LTAD provides a clear pathway to develop our Olympic Weightlifting athletes and grow our sport in Canada. By designing training and competition according to developmental stages, and by addressing key factors such as trainability and physical literacy, LTAD will help more Canadians to pursue Weightlifting as a sport and more Canadian Weightlifters to reach the podium at the Olympics and World Championships.

We know that implementing LTAD will have significant implications for Canadian Weightlifting. It will require greater cooperation and communication between the various stakeholders within the Weightlifting community, and it will require careful planning to address the unique financial, social and geographical context of the sport in Canada.

Everyone involved in the sport system of Weightlifting will play a role in implementing LTAD. Whether we are coaches, administrators, parents or athletes, we will be called to coordinate our efforts to create success. Using LTAD as our guide, we will be asked to examine our practices in coaching, training, and competition and how these practices affect our athlete development and the health of Weightlifting as a whole. Through LTAD, we will declare our intention to serve the best interests of our athletes and ultimately the sport of Olympic Weightlifting in Canada.



GLOSSARY

Adaptation refers to a response to a stimulus or a series of stimuli that induces functional and/or morphological changes in the organism. Naturally, the level or degree of adaptation is dependent upon the 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 a difficult period to define in terms of the time of its onset termination. During this period, most bodily systems become adult both structurally and functionally. Structurally, adolescence begins with an acceleration in the rate of growth in stature, which marks the onset of the adolescent growth spurt. The rate of statural growth reaches a peak, begins a slower or decelerative phase, and finally terminates with the attainment of adult stature. Functionally, adolescence is usually viewed in terms of sexual maturation, which begins with changes in the neuroendocrine system prior to overt physical changes and terminates with the attainment of mature reproductive function.

Ancillary Capacities refer to the knowledge and experience base of a player and includes warm-up and cool-down procedures, stretching, nutrition, hydration, rest, recovery, restoration, regeneration, mental preparation, and taper and peak.

The more knowledgeable players are about these training and performance factors, the more they can enhance their training and performance levels. When athletes reach their genetic potential 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 preschool children aged 1 to 5 years, and late childhood, which includes elementary school-age children, aged 6 through to the onset of adolescence.

Chronological age simply 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.

Developmental age refers to the individual's degree of physical, mental, cognitive, and emotional maturity. Physical developmental age is determined by skeletal maturity, or bone age, after which mental, cognitive, and emotional maturity is incorporated.

Development refers to the interrelationship between growth and maturation over the passage of time. In addition to physical changes, the concept of child development includes social, emotional, intellectual, and motor development.

Growth refers to measurable changes in body size such as changes in height, weight, and percentage of body fat.

Maturation refers to qualitative structural and functional changes as a child progresses toward maturity. One example would be the change of cartilage to bone in the skeleton.

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

Peak weight velocity (PWV) is the maximum rate of increase in weight during the growth spurt. The age of maximum increase in weight is called the age at PWV.

Physical literacy is the development of fundamental movement skills and fundamental sport skills that permit a child to move confidently and with control in a wide range of physical activity, rhythmic (dance) and sport situations. Physical literacy also includes the ability to “read” what is going on

around them in an activity setting and react appropriately to those events.

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

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

Sensitive period of accelerated adaptation to training refers to a point in the development of a specific capacity (e.g. stamina, strength, speed, skill, suppleness) when experience or training has a marked effect on its development.

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

Trainability refers to the genetic endowment of athletes as they respond individually to specific stimuli and adapt to it accordingly. Malina and Bouchard (1991, 2004) defined trainability as “the responsiveness of developing individuals at different stages of growth and maturation to the training stimulus.”

Training age refers to the number of years an athlete has been training in a variety of sports, beginning with the early sampling years.

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APPENDIX A: SPORT INJURY RATE

The American Academy of Pediatrics (2008) reported that the literature reveals participation in weightlifting by children results in few injuries as a result of strict adherence to correct technique. Pierce et al. (1999) reported that in a period of one year, no days of training were lost as a result of injuries incurred in weightlifting competition and training by 70 female and male children ranging from 7 to 16 years of age. The young lifters were permitted to perform maximal and near maximal lifts in competition as long as correct technique was maintained (Hamil, 1994).

Reproduced from the IWF Club Coach Manual – Level 1

Sport	Injuries per 100 participant hours
In school sports	
Track & Field (USA)	0.570
Track & Field (UK)	0.260
Badminton (UK)	0.050
Basketball (Denmark)	0.300
Basketball (USA)	0.030
Basketball (UK)	1.030
Cross Country (UK)	0.370
Fives (UK)	0.210
Football (USA)	0.100
Gymnastics (USA)	0.044
Handball (Denmark)	0.410
Physical Education (UK)	0.180
Powerlifting (USA)	0.0027
Rugby (AUS)	1.480
Rugby (SA)	0.700
Rugby (UK)	1.920
Football (Soccer) (Denmark)	0.560
Football (Soccer) (UK)	0.100
Tennis (USA)	0.001
Tennis (UK)	0.070
Volleyball (USA)	0.001
Weightlifting (UK)	0.0017
Weight Training (UK)	0.0035

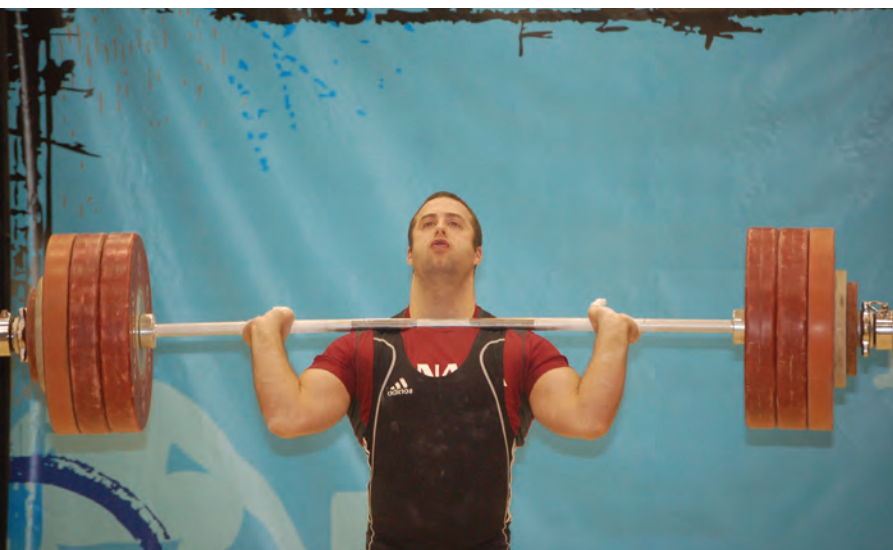


George Kobaladze – 2010 Commonwealth Games Bronze Medalist

APPENDIX B: CWFHC CLASSIFICATION SYSTEM

(SAMPLE – MARKERS WILL BE UPDATED EVERY 4 YEARS)

Bdwt. Category	Marker	Novice Class	Prov. Class IV	Prov. Class III	Prov. Class II	Prov. Class I	Natl. Class	Int. Class IV	Int. Class III	Int. Class II	Int. Class I	Int. Elite	World Class	World Elite
		<45%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%+
MEN														
56kg	265.500	<120	120	133	147	160	173	186	200	213	226	239	253	266
62kg	291.047	<131	131	146	161	175	190	204	219	233	248	262	277	292
69kg	318.188	<144	144	160	176	191	207	223	239	255	271	287	303	319
77kg	346.641	<156	156	174	191	208	226	243	260	278	295	312	330	347
85kg	363.313	<164	164	182	200	218	237	255	273	291	309	327	346	364
94kg	380.484	<172	172	191	210	229	248	267	286	305	324	343	362	381
105kg	396.523	<179	179	199	219	238	258	278	298	318	338	357	377	397
+105kg	417.992	<189	189	209	230	251	272	293	314	335	356	377	398	418
		<45%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%+
WOMEN														
48kg	180.484	<82	82	91	100	109	118	127	136	145	154	163	172	181
53kg	197.305	<89	89	99	109	119	129	139	148	158	168	178	188	198
58kg	212.141	<96	96	107	117	128	138	149	160	170	181	191	202	213
63kg	223.68	<101	101	112	124	135	146	157	168	179	191	202	213	224
69kg	232.109	<105	105	117	128	140	151	163	175	186	198	209	221	233
75kg	240.953	<109	109	121	133	145	157	169	181	193	205	217	229	241
+75kg	262.922	<119	119	132	145	158	171	185	198	211	224	237	250	263



Nick Roberts – National Team Member



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For more information please visit www.canadianweightlifting.ca

For more information on Long-Term Athlete Development,
 refer to *Canadian Sport for Life* and *No Accidental Champions*,
 published by Canadian Sport Centres, or visit
www.canadiansportforlife.ca



Quebec Weightlifting Federation


Nova Scotia Weightlifting Association



Jeane Lassen – 2008 Olympian

Commitment
FOCUS Speed
Strength Athletic Flexible
Explosive
POWER FOCUS Speed
Strength
Athletic Flexible
Commitment
Explosive
R FOCUS Speed POWER
Strength Athletic Flexible

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