

an overview

Long-term athlete development plan

FOR ROWING



ROWING
CANADA
AVIRON

PROVINCIAL ROWING associations



Rowing New Brunswick Aviron



www.rowingcanada.org

We acknowledge the financial support of the Government of Canada through Sport Canada, a branch of the Department of Canadian Heritage.

Nous reconnaissons l'appui financier du gouvernement du Canada par l'entremise de Sport Canada, une direction générale du ministère du Patrimoine canadien.

Canada 

contents



Foreword	4
Introduction	5
Why do we need CS4L and LTAD?	6
How to Use the CS4L Framework	8
Late Entry Athletes and LTAD	9
The 10 Key Factors Influencing LTAD	10
Trainability	12
Stages of LTAD	15
Long-Term Athlete Development Framework	16
Awareness Stage	17
First Contact/Recruitment Stage	17
Active Start	18
FUNDamentals	18
Learn to Train	19
Train to Train	20
Learn to Compete	22
Train to Compete	24
Train to Win	26
Train to Win 2	27
Competitive for Life	28
Active for Life	29
Practical Implications of LTAD	30
Implementation	32
Conclusion	33
Annual Competition Calendar	34
Race Distance Chart	35
Glossary of Terms	36
Selected Bibliography	37
Acknowledgements	38



FOREWORD

The Canadian Sport for Life (CS4L) movement promotes healthy growth and development through good sport, so people can enjoy a lifetime of physical activity and excel in sport. Rowing Canada Aviron (RCA) embraces the CS4L movement as it supports our organization's three strategic goals – 1) Winning gold medals; 2) Increasing participation in our sport, and 3) Building a sustainable organization. This movement has gained momentum not only in sport organizations but also in education, health, active living and recreation.

RCA has adopted the principles of LTAD and is promoting the building blocks of an integrated sport development system for rowing in partnership with provincial rowing associations, member clubs and other organizations engaged in community health and wellness. Through LTAD, we are building the foundations for a strong organization that is capable of sustaining excellence at the international level as well as building participation in rowing throughout all stages – ensuring that our sport, with its inherent health, social and fitness benefits is available and accessible to all.

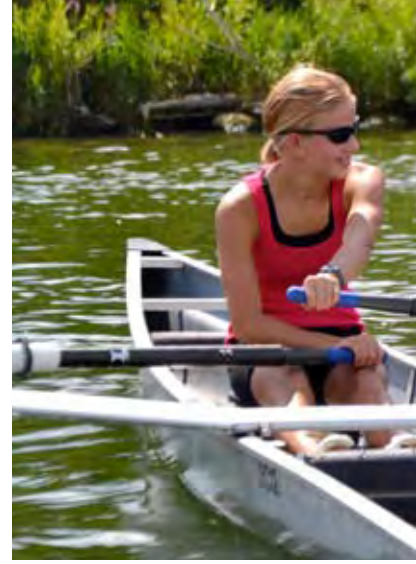
The Canadian version of LTAD uses the core concept of “a training, competition, and recovery program based upon developmental age – the maturation of an individual – rather than chronological age.” It also takes into consideration the unique nature of the Canadian sport system and culture. Over the past few years, national sport organizations have further customised this model to meet the athlete development needs and are re-examining their sport development programs and services to align with the principles of LTAD. CS4L, with LTAD, represents a paradigm shift in the way Canadians lead and deliver sport and physical activity in Canada.

For RCA, the implementation of LTAD provides a clear path for athlete and program development throughout the country. It reflects the unique nature of athlete development in rowing and identifies the most appropriate methods and structures to support both excellence in performance and life-long benefit to individuals who participate in rowing for health and recreation. As one of the first National Sport Organizations to embrace and adopt a sport-specific Long Term Athlete Development model, Rowing Canada Aviron continues to be a leader in this area.

With our LTAD plan and Competition Review complete, our focus as an organization has been on education and communication to our membership and working in partnership with the provincial rowing associations on the practical implementation of our LTAD model in rowing. This includes taking the steps needed at all levels of the sport to make changes to our competition structure and calendar.

As we move forward, we are continually learning and realigning our programs and resources to ensure we are working with the most up-to-date information and adopting innovative ideas. This updated version of our LTAD overview document represents the new learning and now incorporates the needs of athletes with a disability and adaptive rowing in a stage-by-stage approach. It identifies developmentally appropriate training, competition, and recovery at all stages for rowers with a disability. It also recognises a “Competitive for Life” stage that includes rowers who may not be in the “excellence” stream (on the path to high performance) but who still enjoy training and competing in a club environment.

RCA's success in continuing to move forward with our LTAD goals is the result of incredible collaboration and teamwork from many of our volunteers. RCA commends these volunteers for their insight and leadership and we look forward to working with them to ensure that this model has the impact that it deserves within our programs.



RCA IS WORKING
TO ENSURE THAT
THIS MODEL HAS
THE IMPACT THAT
IT DESERVES
WITHIN OUR
PROGRAMS.





INTRODUCTION

Long term athlete development (LTAD) is about making sure that athletes get optimal training, competition, and recovery throughout their career in order to allow them to

- reach their athletic potential.
- enjoy lifelong participation in rowing and other physical activity.

CS4L recognises that athlete development is a long term process – there are no short cuts. Children need to build physical literacy – the mastering of fundamental movement skills and fundamental sport skills – by participating in a wide variety of sports and physical activity when they are young. A solid foundation of movement skills and fitness is critical for everyone, especially athletes participating in late-specialization sports such as rowing. LTAD also contributes to health and a lifelong enjoyment of rowing and other physical activity. We should be reassured that children do not need to start rowing early (that is, before 11 to 16 years of age) in order to excel. In fact, early specialization in rowing can harm long-term development.

LTAD defines a clear, seamless development pathway. It gives coaches, administrators, clubs, and others involved in rowing a clear understanding of how they can best support the athletes for whom they are responsible. And it gives athletes a clear idea and understanding of what they need to do and when they need to do it in order to excel at the elite level.

Training, racing, and recovery programs are based on an athlete's developmental age rather than chronological age and are designed to optimise development during sensitive periods of accelerated adaptation to training. LTAD also takes into account the physical, mental, emotional, and cognitive development of all participants.

LTAD will

- establish a clear and consistent development pathway for rowers.
- guide the examination of the current system to identify strengths, gaps, and inconsistencies.
- guide coaches in planning training, competitive, and recovery programs that are consistent with the principles of growth and maturation, allow athletes to achieve optimal performances, and encourage them to stay in the sport for life.
- guide coaches in developing remedial programs for late-entry rowers.
- improve recruitment and development of early-entry rowers.
- help Canadian rowers to perform better and more consistently at the elite level, across programs, and from year to year.
- provide a framework for creating developmentally appropriate programming based on stage-by-stage guidelines for all rowers.

This overview

- describes the principles on which CS4L is based.
- identifies sensitive periods of accelerated adaptation to training and how these relate to rowing.
- outlines the LTAD framework for rowing, including the objectives, key outcomes, and elements for each stage.
- highlights some of the practical implications for regattas, equipment, clubs, athletes, parents, recruiting, and how and when to learn to row.
- outlines some of the steps needed to implement LTAD.
- describes additional requirements needed for adaptive rowing and athletes with a disability.



WHY DO WE NEED CS4L and LTAD?

canadian rowers have excelled on the world stage and Canada is considered a strong rowing nation. so why do we need LTAD? in short, we need it so that we continue to excel at the international level and continue to increase our membership at the domestic level.

LTAD will contribute to domestic development. It can help clubs address issues such as:

- how to attract people to rowing and retain them.
- how to provide effective, developmentally appropriate and enjoyable programs for all rowers.
- how the competition structure can meet the needs of rowers across Canada and at all stages of development.
- what programs should be developed to encourage and support programs for athletes with a disability.

Successful international athletes in all sports who want to continue to do well must continue to learn and improve. If their development stops, they will get beaten.

The same is true for the Canadian rowing system. We must continue to learn and improve if we want to remain successful. As well, the success of Canadian rowers at the international level has not been inconsistent across years and across programs. There have been ebbs and flows, and some programs have had more consistent success than others. What can we do to reduce the ebbs and make all our programs consistently strong, year after year? How and to what extent does the existing system enhance athlete development and performance? How does it interfere? Where can we improve? LTAD will guide us in analysing the Canadian rowing system, highlighting its gaps and shortcomings, and developing solutions.



Sport technical experts have identified a list of shortcomings in the Canadian sport system and their consequences for athletic participation and performance. LTAD was developed by sport scientists and technical experts to address these shortcomings. Some of the key observations are listed below.¹

- training and competition are based on chronological age, rather than developmental age.
- training programs fail to take full advantage of sensitive periods of accelerated adaptation to training.
- training and competition in the developmental stages place too much emphasis on short-term outcomes (winning and racing), rather than on process (physical training and technical development).
- novice rowers tend to begin racing before technical skills are developed.
- adult and elite training and competition programs are imposed on young and/or developing athletes.



- training methods and programs developed for male athletes are imposed on female athletes.
- fundamental movement and sport skills are not taught properly.
- physical education programs in schools, recreational programs, and elite competitive programs are poorly integrated.
- the most knowledgeable and experienced coaches are encouraged to work at the elite level; coaches who work with development athletes often lack the necessary training, skills, expertise, and experience.
- adaptive rowers are often moved through to competition too quickly before mastering the technical skills and physical abilities needed to race effectively.

Consequences of these shortcomings include

- children not having fun because the programs are designed for adults and focus on outcome rather than process.

- children and adults with poor movement abilities, poor skills, and lack of a proper fitness base.
- athletes pulled in different directions by school, club, provincial, and national team demands.
- athletes who “fall through the cracks” in the system (that is, who fail to achieve their potential and leave the sport).
- athletes frustrated by the lack of consistent and integrated support that will help them to perform well.
- no systematic development of the next generation of international athletes.
- inconsistent international performances.
- injuries, burn-out, and frustration.

The overall sport system and the rowing system must consider the principles of growth and maturation in order to provide athletes with what they need at different stages in their development.

¹ For a more complete list of the shortcomings and their consequences, see *Canadian Sport for Life*, page 17.

HOW TO USE THE CS4L FRAMEWORK

The first four to five stages in the LTAD model (up to Learn to Compete) are defined by key phases in growth and development when an athlete's body is especially responsive to a particular training stimulus. These "sensitive periods of trainability" are linked to developmental age, and are not rowing specific. Later stages in the LTAD model (from Learn to Compete onwards) are defined largely by goals and rowing specific performance markers rather than by growth and development.

Given that many athletes start rowing late (after the stages defined by biological markers), few will fit neatly into one LTAD stage. Rather, an athlete may be at the Learn to Train stage in terms of rowing skill, but at the Learn to Compete or Train to Compete stage in terms of physiological capacities and previous competitive experience.

ATHLETES WITH A DISABILITY

Throughout each stage, athletes participating in adaptive rowing have been considered. In many cases, the stage objectives are the same as athletes without a disability. Any differences or additional program needs are highlighted.





Late ENTRY ATHLETES and LTAD

Rowing is a late entry sport. Some athletes may be introduced to rowing during the late Learn to Train stage (before the adolescent growth spurt), but most start later. As a result:

- rowing has little role to play in the Active Start and FUNDamentals stages of LTAD. However, these stages, irrespective of age, are important for building physical competence and confidence, developing agility and flexibility and building general athleticism, all of which will help athletes develop as rowers.
- athletes will often start rowing around or after peak height velocity (PHV) – a critical benchmark for the development of several key capacities, including skill, aerobic capacity and strength. Rowing coaches may not have the opportunity to 1) identify PHV and 2) take advantage of the sensitive periods of trainability that are linked to it.
- the previous athletic background and development of late entry rowers will affect their rowing development. Late entry athletes will benefit from programs that assess their capacities (physiological capacities as well as those relating to training discipline, psychological preparation, movement screening, nutrition, hydration, recovery etc.) and individualise training to compensate for earlier gaps.
- late entry rowers will not fit neatly into one LTAD stage. All will enter at the Learn to Row stage in terms of their

rowing specific skill. Where they fit in terms of other capacities will depend on their previous athletic experience and training, as well as on their 'developmental age.'

- athletes with a disability may start rowing later in life with varying degrees of sport background. Depending on the nature of the disability (congenital or acquired), the athlete may need to re-learn many of the fundamentals. This will affect how quickly that athlete moves through each stage.

Coaches (and others) are encouraged to use the LTAD framework:

- to assist them in assessing late entry athletes and in individualizing training to compensate for 'gaps'.
- to understand the progression or sequence of development of rowing technique, tactical skills, psychological preparation and to understand the equipment and coaching needs of athletes at different stages of development.
- to identify the type of work appropriate for an athlete of a given developmental age, regardless of their rowing skills. Novice rowers may need to do much of this physical work on the ergometer or by cross-training, until they develop the technical proficiency to do it on the water.
- in the rush to develop late entry athletes, coaches must be careful not to omit work on capacities that are fundamental to both long term enjoyment and high performance success.

THE 10 KEY FACTORS INFLUENCING LTAD

THE FOLLOWING FACTORS ARE THE RESEARCH, PRINCIPLES
AND TOOLS UPON WHICH LTAD IS BUILT

1. EXCELLENCE TAKES TIME

Research indicates that it takes at least 10 years and 10,000 hours of training for a talented athlete to reach elite levels. For example, the United States Olympic Committee found that, on average, it took 13 years for an athlete to make the Olympic team and 15 years to win an Olympic medal. Athlete development is not a short-term process. Short-term performance goals must not be allowed to undermine long-term athlete development.

For athletes with a disability, the length of time to reach elite levels will vary based on the nature of the disability (congenital or acquired), previous sport experience and expertise within sport.

2. THE FUNDAMENTALS

Fundamental movement skills, such as agility, balance, co-ordination and speed (ABC's), and fundamental sport skills, such as running, jumping, throwing, kicking, catching, and swimming, are the basis for all sports. A child is considered to be physically literate when he or she has mastered the fundamental movement and sport skills. Children best develop these skills before the onset of their growth spurt in adolescence. An individual who is not competent in the basic movement skills will have difficulty participating in a range of sports and will have fewer opportunities for athletic success and lifelong enjoyment of physical activity.

A child with a disability should be exposed to as many fundamental movement skills as possible. Activities may be modified as required.

3. SPECIALIZATION

Rowing is a late-specialization sport. We depend on other components of the sport system such as schools, recreation centres, and other sports to provide children with opportunities to develop physical literacy (during the FUNDamentals stage) and early speed and suppleness (during the Learn to Train stage). Athletes need to participate in a variety of sports and physical activity during the FUNDamental and Learn to Train stages in order to succeed in a late-specialization sport such as rowing.

LTAD actively discourages early specialization in late-specialization sports. Specializing before the age of 10 in late-specialization sports contributes to imbalanced physical development, inadequate development of the full range of basic movement and sport skills, overuse injuries, and early burnout.

4. DEVELOPMENTAL AGE

LTAD is based on developmental age, not chronological age. We all follow the same stages of development from early childhood through adolescence, but the timing, rate, and magnitude of development differs amongst individuals. During late childhood and adolescence, athletes who are the same chronological age may be four to five years apart developmentally. Coaches need to understand these developmental differences and take them into account when they design training programs and select athletes.

LTAD IS BASED ON DEVELOPMENTAL
AGE. DURING LATE CHILDHOOD AND
ADOLESCENCE, ATHLETES WHO ARE THE
SAME CHRONOLOGICAL AGE MAY BE 4 TO
5 YEARS APART DEVELOPMENTALLY. THE
ATHLETES SHOWN HERE ARE THE SAME
CHRONOLOGICAL AGE, BUT ARE AT DIFFERENT
STAGES OF MATURATION AND REQUIRE
DIFFERENT TRAINING REGIMES.



5. TRAINABILITY*

All physiological systems are always trainable, but there are periods in development when the body is particularly responsive to specific types of training. Doing the right type of training at the right time, to coincide with these sensitive periods, will help an athlete to achieve their full genetic potential.

*See a more in-depth description of Trainability and the ten S's on pages 12, 13 and 14.

6. PHYSICAL, MENTAL, COGNITIVE, AND EMOTIONAL DEVELOPMENT: A HOLISTIC APPROACH

LTAD considers the whole athlete. At each stage, coaches should consider the emotional, mental, and cognitive development of each athlete, in addition to their physical development, when they plan training, racing, and recovery programs.

7. PERIODIZATION

Periodization provides the framework for organizing training (for example, the mode, volume, intensity, and frequency of training), racing, and recovery into a logical and scientifically based schedule in order to achieve optimum performance at the required time. A periodization plan that takes into account growth, maturation, and trainability principles should be developed for each stage of athlete development.

8. CALENDAR PLANNING FOR COMPETITION

The system of competition makes or breaks athletes: the regatta system and calendar should support and be consistent with LTAD. Different stages of development have different requirements for the type, frequency, and level of competition. At some stages



of development (for example, Train to Train), training and development should take precedence over formal racing and short-term success. At later stages, it becomes more important for athletes to experience a variety of competitive situations and to perform well at high-level regattas.

An effective competition structure for adaptive rowing must be developed to ensure that rowers have opportunities to compete domestically. Openness and flexibility among regatta organisers is critical to ensure that developing athletes have access to appropriate events to support their development.

9. SYSTEM ALIGNMENT AND INTEGRATION

LTAD recognises that physical education, school sports, recreational activities, and competitive sports are interdependent. For example, as a late-specialization sport, rowing depends on schools and other sports to provide children with opportunities to develop the physical literacy and early fitness that are the foundation for both a lifetime of physical activity and athletic excellence.

For the system to work well, all parts of the Canadian rowing system – clubs, schools, provincial associations, Rowing Canada Aviron, and regattas – across all regions must be integrated and aligned with one another. They must be mutually supportive, clear in their roles and responsibilities, and clear in how they contribute to the “bigger picture” of athlete development. Just as the athletes in a fast crew must integrate and align their movements, the components of the rowing system must integrate and align their activities.

Rowers will do best in a rowing (and sport) system that is clear, seamless, and based upon a consistent set of principles. LTAD allows rowers to identify the opportunities available to them and to understand the pathway they need to follow. If they want to row at an elite level, they will know (in general terms) what type of training, racing, and recovery they should be doing at each stage, when they should start to specialise in rowing, and what they need to do to move up through the system. They (and their parents) will have the knowledge to advocate for programs, coaching, equipment, regattas, and other services that will support their long-term development. In a system where the various elements are integrated and aligned, rowers will be less likely to “fall through the gaps.”

10. CONTINUOUS IMPROVEMENT

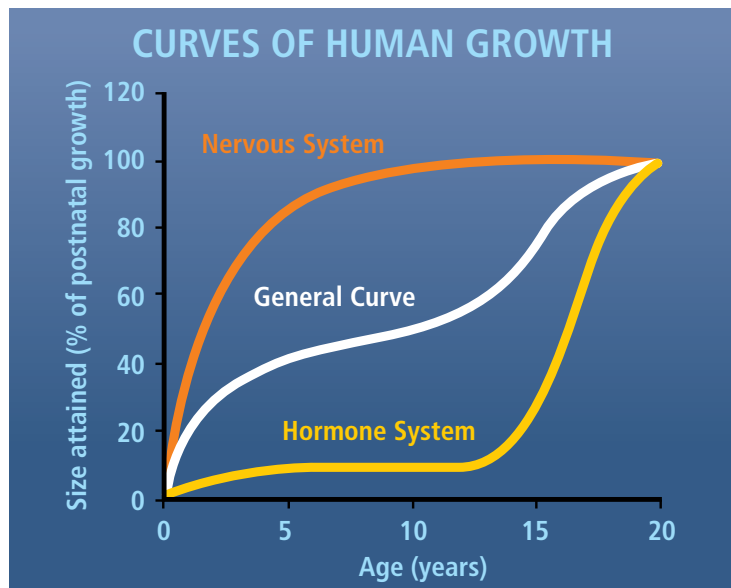
LTAD is based on the best available scientific research and empirical evidence, but knowledge and understanding evolve. LTAD should respond to, integrate, and, in some cases, stimulate research and rowing-specific innovations. Examining and evaluating new ideas for expanding programs for athletes with a disability and adaptive rowing will provide exciting and innovative ways to grow the rowing community.

Trainability

Trainability refers to how responsive an individual is to a training stimulus at different stages during growth and maturation. Although all physiological capacities are always trainable, there are sensitive periods in the development of a specific capacity during which training has the most effect. These are referred to as "windows of optimal trainability." Correct training during these windows is essential for individuals to achieve their genetic potential.

Scientific evidence shows that humans vary considerably in the magnitude and rate of their responses to a given stimulus. This variability underlines the need for a long-term approach to athlete development, so that athletes who respond slowly are not short-changed.

Sport scientists have identified five physical capacities (the five S's of Training and Performance): Stamina, Strength, Speed, Skill, and Suppleness. For stamina and strength, the optimal periods of trainability are based on developmental age; specifically, the onset of the adolescent growth spurt. For speed and suppleness, the optimal periods of trainability are based on chronological age. Note that, on average, girls reach these periods at a younger chronological age than boys. An additional five S's have been identified as important to building a complete and holistic plan for the developing athlete including: stature/structure, (p)sychology, schooling, sustenance and sociocultural.



Modified from Scammon, 1930

FIVE S's OF TRAINING

STAMINA (ENDURANCE)

The window of optimal trainability occurs at the onset of Peak Height Velocity (PHV), commonly recognised as the adolescent growth spurt. Athletes should focus on aerobic capacity training as their growth rate accelerates; aerobic power should be introduced progressively after growth rate decelerates. Aerobic capacity and power are crucial for rowing.

STRENGTH

For girls, there are two windows of optimal trainability for strength: the first is immediately after PHV and the second is at the onset of menarche. For boys, there is one strength window that starts 12 to 18 months after PHV.

SPEED

There are two periods for optimal trainability of speed. During the first speed window, training should focus on developing agility and quickness; during the second speed window, training should focus on developing the anaerobic alactic energy system. For girls, the first speed training window occurs between the ages of 6 and 8 years and the second window occurs between the ages of 11 and 13 years. For boys, the first speed training window occurs between the ages of 7 and 9 years and the second window occurs between the ages of 13 and 16 years.

ON AVERAGE, A CHILD'S NERVOUS SYSTEM IS FULLY DEVELOPED BY 10 YEARS OF AGE. THUS, THE OPTIMAL PERIOD FOR DEVELOPING FUNDAMENTAL MOVEMENT SKILLS AND A RANGE OF BASIC SPORT SKILLS IS BEFORE THE ONSET OF THE GROWTH SPURT.

THE HORMONAL SYSTEM UNDERGOES RAPID DEVELOPMENT DURING ADOLESCENCE. THIS IS THE OPTIMAL PERIOD FOR DEVELOPING AEROBIC CAPACITY, AEROBIC POWER AND STRENGTH.

THE GENERAL GROWTH CURVE DESCRIBES OVERALL GROWTH OF THE SKELETAL SYSTEM, ORGANS, AND CELLS.

SKILL

For girls, the window for optimal skill training occurs between the ages of 8 and 11 years; for boys, it occurs between the ages of 9 and 12 years, or more precisely before the onset of the growth spurt. During this window, children should be developing physical literacy; that is, competence in the fundamental movement and sport skills that are the foundation for all sports. Competence in these skills makes it easier for children to learn and excel in late-specialization sports such as rowing.

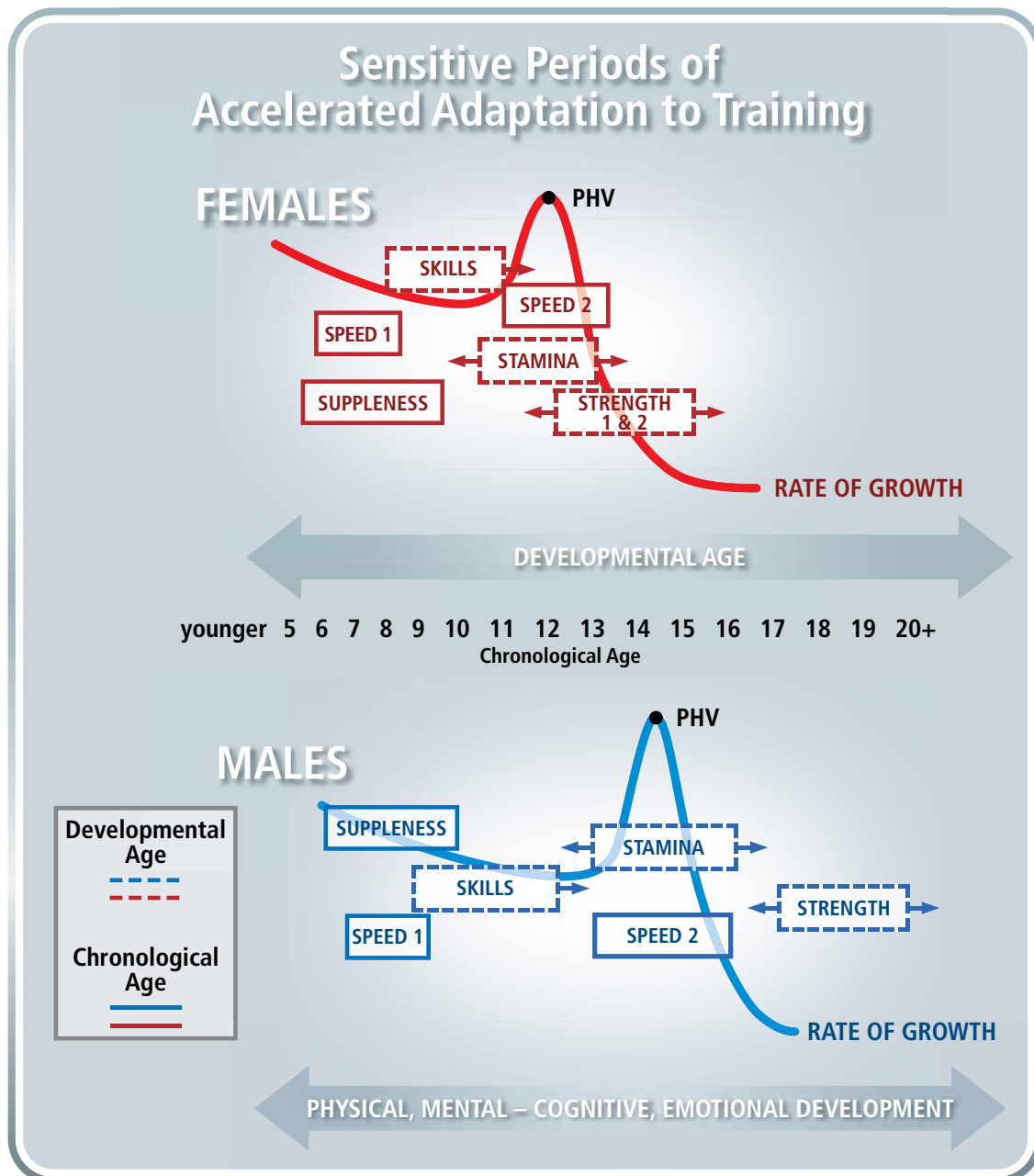
SUPPLENESS (FLEXIBILITY)

For both girls and boys, the window of optimal trainability for suppleness occurs between the ages of 6 and 10. In addition, special attention should be paid to flexibility during PHV.

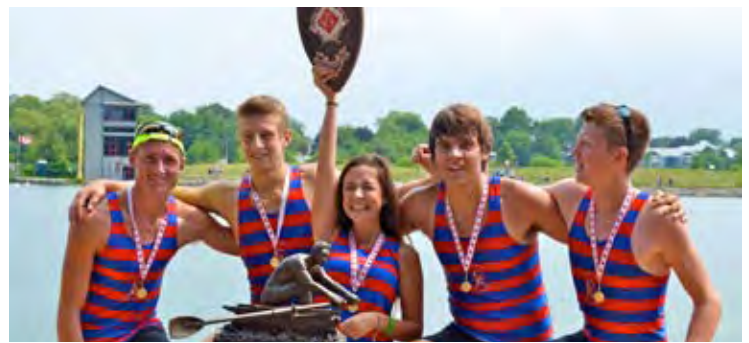
The windows of optimal trainability for speed, skill, and suppleness occur before children start rowing. The rowing community should consider building relationships with schools, recreation centres and other sports to advocate and support appropriate training during these early stages.

For athletes who miss these training windows, coaches will need to design and implement individualised programs to remedy any shortcomings.

Athletic excellence and enjoyment of lifelong physical activity are both built on a foundation of doing the right type of training at the right stage of development.



Adapted and Modified from Balyi and Way, 2005



ADDITIONAL FIVE S's

STATURE/STRUCTURE

This component addresses the stages of growth in the human body linking them to the windows of optimal trainability. It recognises stature (the height of a human) before, during and after maturation, guiding a coach or parent to the measurements of tracking growth. The tracking of stature provides a guide to developmental age in order to address the windows of optimal trainability for strength, endurance and skills. In many cases, late entry rowers are finished growing. However, those athletes who are late maturers, participate in rowing and are still growing can take advantage of an adjusted training plan based on peak height velocity (PHV). Diagnostics should be used to identify strengths and weaknesses based on structure.

(P)SYCHOLOGY

Rowing is a physical and mental challenge – both in training and in competition. The ability to maintain focus is a skill that is essential to quality performances at all stages in rowing and in any sport. Often the mental training aspect of sport is not introduced at an early stage. However, it is well recognised that goal setting, distraction control, motivation and handling pressure must be introduced and practiced at all stages of athletic development in order to effectively manage pressure situations in the increasingly competitive environments.

SUSTENANCE

Sustenance recognises a broad range of components with a central theme of replenishing the body to prepare the rower for training, competition and managing life. Areas addressed include: nutrition, hydration, sleep, rest and regeneration – all these need to be used effectively within the training plan. Variations in sustenance will depend on the rower's developmental age as well as their performance objectives pursued within the overall periodised plan. As the rower advances along the excellence pathway and becomes a full-time athlete, more attention must be placed on the activities away from the training environment to ensure monitoring of recovery.

SCHOOLING

School and education are an important part of the athlete's life and certainly impact success in their future. In Canada, a rower can continue their education and pursue excellence in rowing simultaneously in the Learn to Train stage up to and including the Train to Compete stage. Once a rower moves to a National Training Centre (Train to Win 1), the training and competition demands make it difficult to do both.

When the rower is in high school, university or community college, the training and competition plan should recognise the school schedule and the various demands on the athlete. Training volumes and competition schedules should reflect these demands to ensure quality performances in school as well as in rowing. Compromising educational aspirations in the early LTAD stages is not advised.

SOCIOCULTURAL

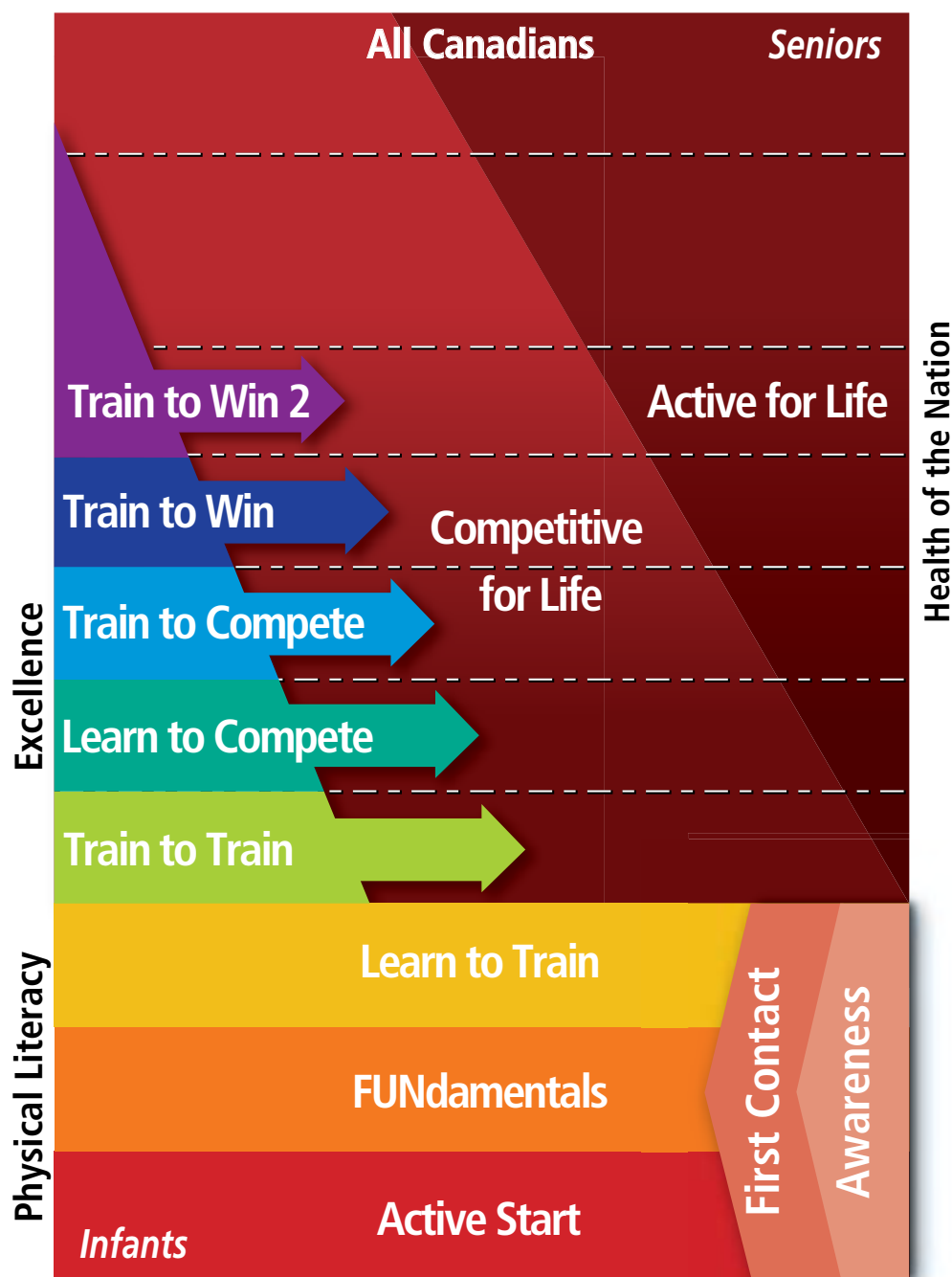
The sociocultural aspects of sport are significant and must be managed through proper planning. Exposure to various cultures provides the broadening of perspectives, including ethnicity awareness and national diversity. Within the travel schedule, recovery sessions can include education related to competition location such as history, geography, architecture, cuisine, literature, music and visual arts. Proper scheduling can allow sport travel to offer much more than simply commuting between the hotel and the regatta site.

Sport socialization also must address the sport sub-culture to ensure general societal values and norms that will be internalised through sport participation. Overall sociocultural activity is not a negative distraction or an interference with competition.

The LTAD framework highlights the key elements of each stage for rowing. Keep in mind that athlete development is a continuous process, not a sequence of distinct steps, during which skills, training, competition and recovery become progressively more specific and specialised. For example, children progress from learning fundamental movement skills, to building fundamental sport skills and water skills, to learning general rowing skills (sculling and sweeping in a variety of boats), to specializing in either sculling or sweep, and eventually, to specializing in a particular seat and boat class.

a STAGE-BY-STAGE APPROACH FOR OPTIMAL ROWER DEVELOPMENT

Canadian Sport for Life

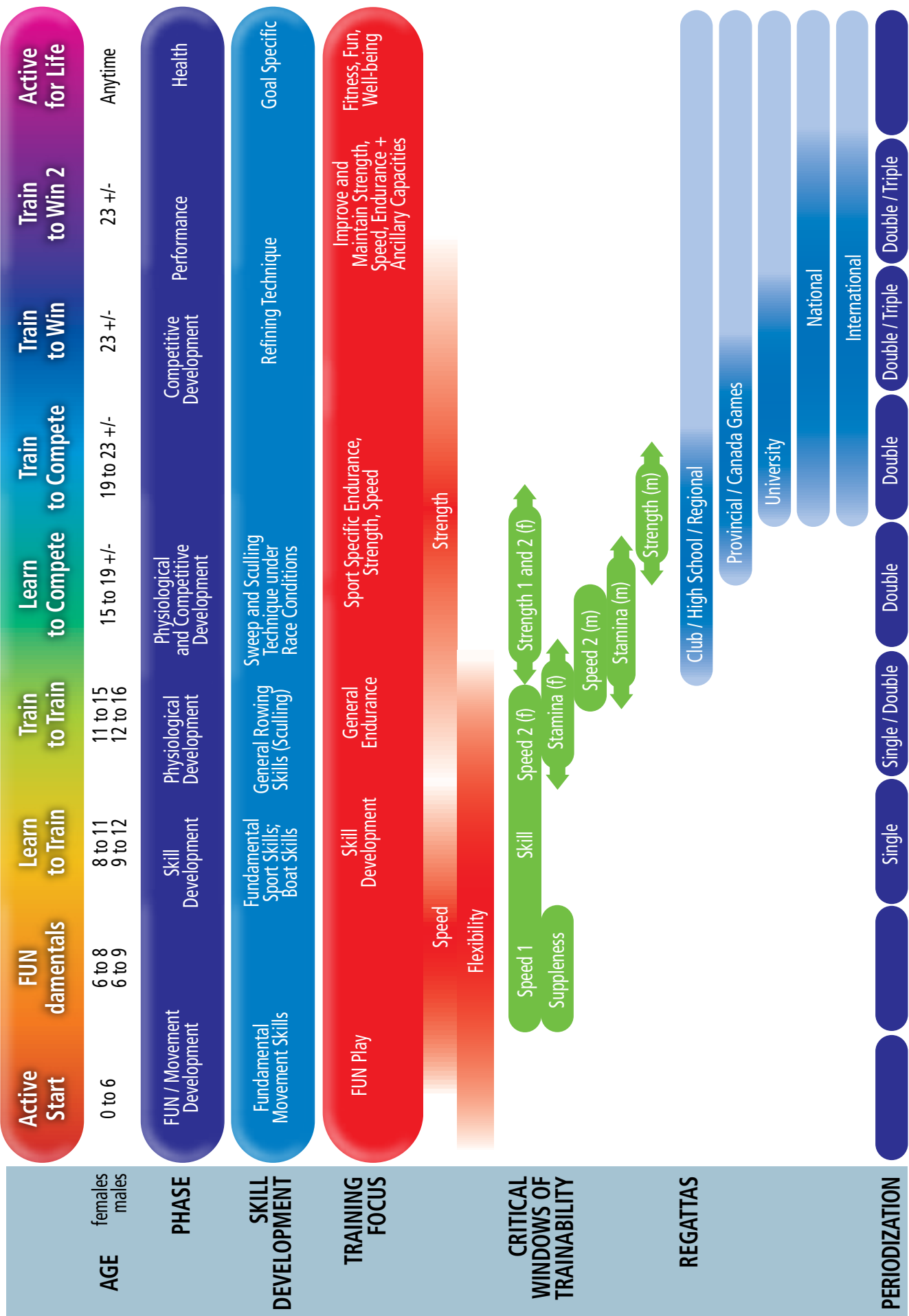


Adapted from diagram in Canadian Sport for Life Presentation, January 2011

RCA's LTAD model depicts twelve stages from birth to senior years, and provides rowing-specific program guidelines regarding developmentally appropriate technical, competitive and recovery for rowers within each stage. In Canada, many people come to rowing relatively late in their development. In reviewing the document, remember that all rowers (youth, adaptive, older adults, late entry) enter at the "learn to train" stage and proceed on a pathway toward "excellence," "competitive for life" or "active for life." The focus in the early stage – Learn to Train – is on developing technical proficiency.

Two additional stages are also included: Awareness and First Contact/ Recruitment stages are to inform individuals of the range of activities in which they can participate and to provide ways for them to experience those activities. A positive first experience can go a long way to engaging persons with a disability in both competitive and recreational sporting activity. The period following acquisition of a disability is one of transition and great change for most individuals. Some activities in which they were previously engaged may no longer be open to them in the same form, and they may not be aware of the many sporting and recreation activities that are available.

LONG-TERM ATHLETE DEVELOPMENT FRAMEWORK

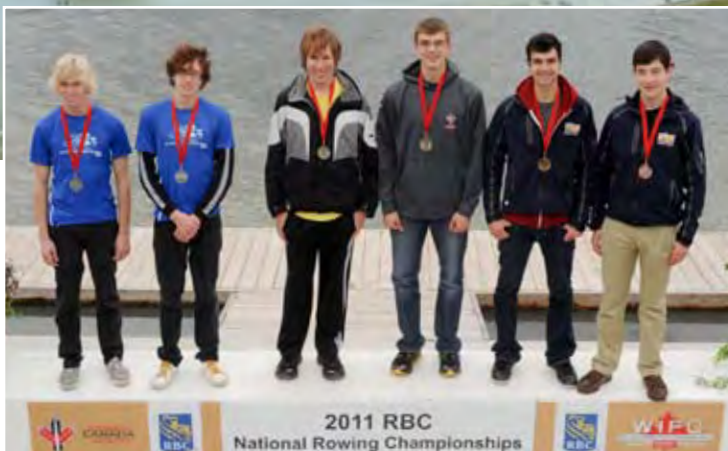


Awareness Stage

Sport opportunities for people with a disability are not always well known and someone who acquires a disability may have no knowledge that rowing exists as a sport option. Rowing and rowing clubs need to promote and advertise programs within the disability community such as rehabilitation centres, schools, and other disability sport organizations.

FIRST CONTACT/RECRUITMENT STAGE

Rowing clubs only have one opportunity to create a positive environment for prospective adaptive rowers. It may not be easy for potential new members to make the first visit to the local rowing club, and research shows that if they don't have a positive first experience, they may be lost to the sport and to a healthy lifestyle.



ACTIVE START

AGE: 0-6 YEARS

OVERVIEW

Physical activity should be fun and a natural part of a child's daily life. Active play is the way young children learn and are physically active.

KEY OBJECTIVE RELATED TO DEVELOPMENTAL AGE

Learn fundamental movement skills

FUNDAMENTALS

AGE: FEMALES 6-8 YEARS
MALES 6-9 YEARS

OVERVIEW

Children will benefit from participating in a variety of sports and physical activities in order to develop fundamental movement skills.

KEY OBJECTIVE RELATED TO DEVELOPMENTAL AGE

Be competent and confident in fundamental movement skills.

Additional information on these stages can be found in *Developing Physical Literacy: a Guide for Parents of Children Ages 0-12*.



The  symbol indicates information that is not tied to an athlete's "developmental age."

Learn to Train

Learn to Row, messing around in boats

OVERVIEW

At the Learn to Train stage children are developmentally ready to learn and master general sport skills and should be encouraged to participate in a wide variety of sports and physical activities. This is also a key window for developing speed and agility.

Children (pre-PHV) should be introduced to a variety of water-based activities such as kayaking, sailing, sculling, and canoeing through short-term programs as well as informal activities.

"Messing around in boats" will build basic boat handling skills and water sense, as well as confidence, as they become

familiar with how boats move, turn, tip, balance, flip over and are affected by wind and water. These early boat skills are best developed through fun activities and technical instruction in a safe environment.

All new rowers will enter at the Learn to Train stage in terms of rowing specific skills and this is the "golden" stage for teaching basic rowing technique. Technical skills learned in this stage are the building blocks for more advanced rowing skills as well as for ensuring comfort and injury-free rowing.

KEY OBJECTIVES DEVELOPMENTAL AGE: FEMALE 8 YEARS TO ONSET OF ADOLESCENCE; MALE 9 YEARS TO ONSET OF ADOLESCENCE

- develop physical competence and confidence in a range for general sport skills.
- develop speed and agility.

KEY OBJECTIVES ROWING SPECIFIC

- develop comfort and confidence in boats and playing in, on, and around the water.
- build water-sense and basic boat-handling skills.
- learn basic rowing skills.

PHYSICAL TRAINING AND TRAINING VOLUMES

- for preadolescents, rowing should occur in short term, seasonal programs or camps (e.g., week long camp or two to four sessions/week for short season.)
- participate in wide variety of other sports or physical activities to develop speed, agility, fundamental sport skills, and for general aerobic fitness.
- continue to work on flexibility (by incorporating stretching into on land warm-up and cool-down.)

TECHNICAL

- develop basic sculling skills (as outlined in LTR Instructor's course), including: basic stroke sequence, grip, balance, posture, basic blade work.
- develop basic boat-handling skills (e.g., turning, backing, steering, stopping, docking, carrying boat.)
- develop basic rowing specific communication skills – giving and responding to clear commands from inside and outside the boat.

EQUIPMENT

- 1x, 2x (racing and recreational/touring, try to provide some experience in "tippy" boats.)
- for preadolescents: flat-water, white water and ocean kayaks, outrigger canoes, canoes, sailing dinghies will all help build boat-handling skills in a fun environment.
- some ergometer work for variety, fun, technical development. For late entry athletes, ergometer work can be used for physiological training.

- rigging: introduce concepts of proper foot stretcher position and rigger height.
- understand how to carry and rack boats, do basic safety inspection, adjust foot stretchers.

TACTICAL

- focus on mastery of basic boat handling, safety and rowing skills required for competent, safe racing.
- introduce athletes to the basic rules, format and commands of racing by incorporating them into training sessions (e.g., lining up side by side, going straight, starting from a stationary position, "Attention GO" and umpire's steering commands.)
- reinforce the ethics of fair racing and safety.

COMPETITION

- incorporate Skills Events/Obstacles into training.
- informal Skills Events at the end of Learn to Row or seasonal camps.
- incorporate short (under 100m) sprints into training sessions.

LIFESTYLE

- introduce basic ideas of nutrition, hydration, safety.
- dressing properly for the weather (heat and cold.)
- focus on FUN.
- encourage rowing as part of a healthy, active lifestyle.

COACHING

- LTR Instructors/LTR Adaptive.
- Journey 123.

ADAPTIVE

- perform initial athlete classification for correct rowing sport class.
- ensure optimal rigging – including strapping and seating – to maximise comfort and decrease risk of injury.
- four main rigging factors to consider for fixed seat rowers:
 - 1) eliminate crossover
 - 2) appropriate span
 - 3) appropriate load
 - 4) supportive seating

TRAIN TO TRAIN

LEARN TO SCULL, BUILDING AEROBIC MONSTERS

OVERVIEW

Developmentally, the Train to Train stage is defined by the onset of the adolescent growth spurt (measured by PHV) and is the key stage for building a strong aerobic base and strength. This is also the developmental stage at which individual differences in rates of maturation are most apparent. Coaches will need to adjust the training program for individual athletes, depending on whether they mature early, average or late. Skilled coaches will also be aware of how different rates of maturation affect performance and selection and of the interaction between social,

emotional and physical development at this stage. Athletes will benefit from understanding how physical changes may affect their physical abilities (e.g., co-ordination, balance, flexibility) and how different rates of maturation may affect their performance relative to their peers.

During this stage, the emphasis is on TRAINING, racing should be secondary. Too much racing (including race preparation and travel) takes away from training time and can detract from consolidating basic technical skills that are critical during this stage.

AGE: onset of adolescence (as defined growth spurt-increase in PHV). Transition to L2C defined by slowing of growth rate.

KEY OBJECTIVES DEVELOPMENTAL AGE

- build aerobic capacity (early-mid T2T.)
- build strength and speed (later in T2T.)

KEY OBJECTIVES ROWING SPECIFIC

- build body awareness and strength to facilitate good posture in the boat and the ability to respond to technical cues.
- become proficient in sculling.
- gain experience in crew boats (2x, 4x.)

TRAINING VOLUMES

- six to nine sessions/week (total.)
- three to six rowing sessions/week (on water or ergometer.)
- participate in complementary sports such as cross-country skiing, running, cycling, speed skating, and swimming but focus on one to two competitive sports.
- annual plan based on single or double periodization.
- erg scores: use to monitor individual improvement, not for cross athlete comparison. At this stage, erg scores will be strongly biased in favour of “early maturing” athletes. Consider reporting erg scores based on weight (e.g. per kg.)
- continue to develop speed (that is, neurological adaptations) by doing short bursts (for example, 10 stroke pieces) at the end of the warm-up throughout the year.
- to avoid overuse injuries, ensure that the volume and intensity of training progresses at a pace the rower’s body and technique can tolerate.
- a late transfer athlete (coming from another sport) may be fit and have a solid aerobic base. However, the volume of training must be increased gradually. Coaches need to be aware of any pre-existing injuries that may affect training.

TECHNICAL

- continue to develop good boat handling skills in a variety of conditions in small sculling boats (1x, 2x.)
- become proficient in sculling, refining technique for efficient boat moving.
- focus on ratio, blade work, efficiency, power application, balance.
- learn to row in a variety of seats (stroke, middle of the boat, bow.)
- continue to develop rowing specific language and communication skills.
- develop basic teamwork skills – respect, support, following, adapting to different partners.

EQUIPMENT

- racing boats: 1x, 2x, 4x.
- learn to rig and de-rig.
- learn to recognise basic rigging problems and how they affect the technique (foot angle and height, pitch, inboard.) Individualised rigging is not necessary.
- demand basic respect for equipment including: basic boat maintenance (washing hull, slides, oar locks); reporting wear and damage; careful carrying; racking and docking.

TACTICAL

- learn basics of race planning, including running, standing and quick starts, pacing, and finish sprints.
- learn basic rules of racing.
- learn to cope with the physical and mental challenges of racing.
- learn to take responsibility for handling a boat and learn to take a problem-solving approach to training, in line with cognitive development.
- athletes can strive to win, but the emphasis is on fun, effort, improvement and good technical performances.



COMPETITION

- timed Skill Events, long distance (head) races.
- incorporate short sprint races (100m) into training sessions.
- local and regional regattas.
- race in a variety of sculling boats (1x,2x,4x.)

PSYCHOLOGICAL PREPARATION

- introduce the area of sport psychology/mental preparation; what it is and how it is part of the whole picture of training and competing as an athlete.
- Introduce mental skills:
 - performance profiling.
 - motivation; introduce concept of goal setting and develop a disciplined approach to training and racing; journaling/logging training.
 - concentration skills; develop the ability to manage distractions in training and racing.
- emphasise the relationship between effort and progress towards individual goals.

LIFESTYLE

- introduce basic ideas of nutrition, hydration, safety already introduced in L2T. Continue to develop knowledge around nutrition, hydration and safety, encouraging athletes to be aware of their individual needs.
- introduce skills of time management with training and racing.
- promote athlete responsibility and independence.
- help athletes understand how physical changes may affect performance.
- changes in performance and perceived ability can affect an athlete's self-confidence directly and through their social standing with peers.

COACHING

- NCCP RCA Coach (weekend one and two.)



ADAPTIVE

- ensure proper athlete classification with trained classifiers prior to racing.
- transition to racing shells prior to increasing intensity and volume of training.
- monitor for injury related to overuse with increase of training volume, particularly for AS and TA athletes.
- create meaningful racing opportunities.

Learn to Compete

Learn to Sweep, Building Racers

OVERVIEW

During the Learn to Compete stage, training increasingly emphasises the development of rowing specific endurance and strength and the skills required for 2000-metre racing. The 'engine' built during the Train to Train stage is refined for the specific metabolic demands of 2000-metre racing.

The key focus of this stage is **LEARNING** to race by giving the athlete lots of opportunities to race in a range of situations and opportunities to make decisions. This includes learning to row technically well in race situations and when fatigued, racing in

a variety of conditions and in a variety of events and developing routines around racing and race preparation.

During this stage, training and racing begin to demand a bigger commitment and athletes who are interested in high performance will begin to diverge (in training) from those who are interested in "Competition for Life." By the end of L2C, smaller athletes may start to specialise in lightweight events. Athletes will attend training camps at regional/provincial centres to get high quality training, coaching and competition.

AGE: FEMALES 15 to 19+/- years • MALES 16 to 19 +/- years

Transition from T2T to L2C is determined by 1) end of adolescent growth spurt (when rapid deceleration of growth turns into slow deceleration) and 2) meeting key rowing specific objectives of T2T.

Readiness for T2C is based on 1) skill, 2) performance at identified regattas and on ergometer tests and 3) establishment of a solid training foundation.

KEY OBJECTIVES DEVELOPMENTAL AGE

- continue to develop aerobic capacity, strength, as well as anaerobic power.
- begin to develop anaerobic endurance once athlete has achieved sexual maturity.

Most objectives are now tied to rowing specific development, rather than developmental age.

KEY OBJECTIVES ROWING SPECIFIC

- develop rowing-specific endurance, strength, speed and skills for 2000-metre racing.
- proficient in 1x, 2x, 4x, under a variety of conditions.
- learn to sweep and develop proficiency in 2-, 4- and 8+.
- race confidently in a variety of regatta and race situations (including seat racing and time trials.)
- competent in steering, bowing, stroking and following.
- develop competence in independent decision-making, with regards to training, racing, and boat handling.
- refine and become comfortable with racing and training routines.

PHYSICAL TRAINING AND TRAINING VOLUMES

- six to 12 sessions/week (total), most of them rowing specific.
- annual plan based on double periodization.
- pick two competitions to peak for, use other competitions to complement training and gain race experience.
- emphasise rowing specific endurance, strength and speed for 2000-metre racing.



- continue anaerobic lactic training started at the end of T2T.
- continue to develop speed including short bursts (10 strokes) at the end of the warm-up throughout the year.

TECHNICAL

- continue to refine and consolidate sculling skills in a variety of boats.
- learn to sweep (both sides), with an emphasis on small boats; larger boats can be used for variety, fun and to further develop speed and quickness.
- continue to develop crew rowing skills and understanding of crew dynamics and teamwork.
- continue to develop competence in steering, bowing, stroking and following.
- develop ability to train and race in a variety of wind and water conditions.



EQUIPMENT

- racing boats: 1x, 2x, 4x, 2-, 4-, 8+.
- understand basic rigging concepts and learn basic rigging procedures (e.g., span, inboard, pitch.)
- start to individualise rig if/when warranted. Learn to feel differences in rigging.
- be capable of inspecting equipment to make sure it is race ready.

TACTICAL

- learn to row technically well under race pressure and when fatigued.
- race in a variety of conditions (head wind, tail wind, cross wind, rough water, buoyed courses, head races) and in a variety of boats and seats.
- learn to race well from in front, behind, in a pack or on your own.
- continue to develop mental toughness and the ability to cope with the physical and mental challenges of racing.
- refine approach to race planning, pacing, starts and finish sprints, adapting race plan to conditions.
- learn to analyse performances objectively. Be business-like and analytical about performance.
- athletes should strive to win, but the focus should be on learning from each race, developing racing skills and racing technically well under a variety of conditions.

COMPETITION

- local, regional, provincial regattas, peaking for priority national competitions (e.g., Canadian Henley, CSSRA, NRCs.)
- time trials and seat racing.
- focus on 2000-metre racing, but also race long distance (head) races.
- incorporate racing and race simulations into training.
- provincial and national ergometer testing.
- multi-sport games such as Canada Summer Games, Western Canada Summer Games.

PSYCHOLOGICAL PREPARATION

- conduct a sport psychology skill questionnaire for self assessment and self awareness.
- Introduce mental skills:
 - relaxation skills.
 - imagery/visualization skills.
 - race preparation and recovery (over a multi day regatta.)
 - understanding pressure in training, racing and selection.
- continue to work on managing emotional responses to increasingly demanding situations.

LIFESTYLE

- refine individualised strategy towards nutrition, hydration, warm up, cool down, recovery and rehabilitation.
- provide access to specialised support such as sport psychologists, physiotherapists, nutritionists, and strength and conditioning experts.
- encourage athletes to educate themselves about development opportunities so that they can make informed choices (e.g., about where to attend university, where to train.)
- focus on integrating sport, education and life demands.
- develop skills to cope with travelling.
- shift to rowing as primary sport (though other sports can be used for cross training.)

COACHING

- NCCP RCA Performance Coach (Competition – Development.)
- consider mentorships and opportunities to work with more experienced coaches.
- NCCP Competition-Development Multi-sport modules.

ADAPTIVE

- create meaningful racing opportunities.
- individualised rigging with consideration of specialised/custom equipment including seating and prosthetics.
- continue to closely monitor for overuse injuries with increased intensity and volumes of rowing specific training.

Train to Compete

TAKING RESPONSIBILITY AS ATHLETES AND RACERS

OVERVIEW

During the Train to Compete stage, athletes mature as racers and high performance athletes, becoming increasingly disciplined in training and responsible and accountable for their performance. Athletes at this stage will strive to win and may achieve success in national and international competitions, but they are still developing as athletes and racers. At the start of this stage athletes should expect to train at a National Development Centre for at least part of the year; by the end of this stage, they should expect to train at a National Training Centre year round.

At the start of T2C, athletes will be capable of winning at Canada Games in small boats, and performing consistently well in small boats at national regattas. They may have been selected to a U23 team or raced successfully at high level regattas for their University. As they develop, they may be capable of winning at World Cup or World Championships (and should certainly strive to win), but are not expected to. By the end of T2C, they are capable of consistently performing well at international regattas, and are capable of winning medals.

AGE: Athletes are ready for T2C when they have the technical skill and training base to handle high volumes and intensities of training and they have met all the objectives of earlier stages. Athletes will demonstrate consistent and improving performances, approaching National Team standards at national level regattas.

Readiness for T2W is based on performance at key regattas (e.g., NRCs) and on ergometer scores.

KEY OBJECTIVES DEVELOPMENTAL AGE

Not applicable. Training at T2C and progression to T2W is now tied to performance and the ability to handle high volumes and intensities of training, not to developmental age.

KEY OBJECTIVES ROWING SPECIFIC

- further refine rowing-specific endurance, strength, speed and skills for 2000-metre racing.
- further refine racing skills, including mental preparation, race strategies and the ability to cope with a variety of race conditions and situations.
- race consistently well under a variety of conditions, maintaining good technique under pressure and fatigue and at high rates.
- be empowered to take responsibility and be accountable for their training, performance, equipment, and other aspects of their rowing life.
- solid performances at international regattas.
- capable of handling the training volumes, intensities, environment and demands of a National Training Centre.

PHYSICAL TRAINING AND TRAINING VOLUMES

- as determined by the NTC coach. Training intensities and volumes will vary throughout the training cycle, but typically there will be at least 12 sessions per week.
- annual plan based on double periodization.
- continue to emphasise rowing specific endurance, strength and speed for 2000-metre racing.
- some individualisation of training, racing and recovery.



- continue to work on strength and flexibility to avoid injuries and correct muscle imbalances.
- athletes may do other sports for cross-training, in the off season and/or for recovery.
- by the early stages of T2C, smaller athletes will choose whether to race as a heavyweight or lightweight.

TECHNICAL

- start to specialise in a particular boat class and seat.
- continue to refine boat moving skills.

EQUIPMENT

- top level racing boats.
- individualised rigging (under coaches direction for crew boats.)
- able to rig own boat.

TACTICAL

- test different strategies. Making mistakes and learning from them is a crucial part of maturing as a high performance athlete.
- continue to refine and individualise racing skills, including pre-race preparation, race strategy, warm up and cool down.
- athletes should strive to win, and indeed may achieve some success in national and international regattas, but the primary focus should still be on learning how to race hard and well.



COMPETITION

- national and international competitions (including World Cup, U23 World Championships and World Championships.)
- competitive pieces, time trials, and race simulations are a regular part of training.
- focus on 2000-metre racing, but also race long distance (head) races.
- continued participation and ranking in National ergometer testing.

PSYCHOLOGICAL PREPARATION

- introduce the concept of Mental Toughness and the key components; Belief, Motivation, Focus, Handling Pressure, Dealing with Physical and Emotional Pain and Lifestyle.
- select two of the above to focus on the specific mental skill in each area. The need of the group would determine which skill to build on in more detail e.g., during winter training Motivation and Focus could be addressed. As racing approaches address Handling Pressure and Belief.
- encourage daily monitoring/journaling of training – self monitoring.

- encourage the use of basic mental skills such as goal setting and imagery.
- conduct group sessions to deliver information.
- conduct one-on-one sessions to develop information for the individual (personalise it) and encourage the regular use of effective mental skills to enhance training and racing.
- develop strategies to manage the imbalances inherent in this lifestyle.

LIFESTYLE

- behaviour and actions reflect progress towards becoming a full time athlete.
- refine strategies to cope with overseas travelling.
- athletes should have access to specialised support such as sport psychologists, physiotherapists, nutritionists, and strength and conditioning experts.

COACHING

- NCCP RCA Performance Coach (advanced.)
- NCI Advanced Diploma Program.
- NCCP RCA High Performance Coach (at NTC.)



OVERVIEW

Athletes in the Train to Win stage will be training full-time at a National Training Centre or National Development Centre, performing consistently well at international races and be capable of winning medals at international regattas. They will really be “training to win.” At this stage, gains in speed will be incremental.

Most improvements in performance will likely come through better race preparation and execution, arising from race experience, maturity, improved psychological preparation and mental toughness. Additional gains can come through refined management of nutrition, hydration, recovery/regeneration and rehabilitation.

AGE: Transition to T2W is based on performance

KEY OBJECTIVES DEVELOPMENTAL AGE

Not applicable.

KEY OUTCOMES ROWING SPECIFIC

- win medals at World Cups, World Championships and Olympic Games, Paralympic Games.

PHYSICAL TRAINING AND TRAINING VOLUMES

- as determined by the NTC and NDC coaches.
- annual plan based on double or triple periodization.
- breaks should be built into the calendar to prevent injuries and physical or mental burn-out.
- focus on achieving incremental gains in physiological capacity, with more individualisation of the training program (based on physiological testing.)
- continue to work on strength and flexibility to avoid injuries and correct muscle imbalances.

TECHNICAL

- continue to refine technique and correct technical problems.
- be aware of technical problems that may be linked to injury, loss in flexibility or muscle imbalances and deal with the underlying problem.
- train in a variety of boats throughout the year, but with most work in small boats.

EQUIPMENT

- top level racing/training boats.
- consider working with equipment makers to develop and test innovations in equipment.
- continued refinement and individualisation of rigging.

TACTICAL

- continue to refine and “play with” racing skills and strategies.
- continue to refine pre-race preparation, warm up, cool down, post-race recovery.

COMPETITION

- NRCs, international competitions (including World Cup, World Championships and Olympic Games and Paralympic Games.)
- competitive pieces, time trials, and race simulations are a regular part of training.
- focus on 2000-metre racing, but also race long distance (head) races.
- national ergometer testing.

PSYCHOLOGICAL PREPARATION

- continue to build on the Mental Toughness themes, addressing those which haven’t been discussed and developing individual and crew strategies to be effective in each of the components.
- maximising daily effort – creating purpose and intent to every session.
- developing race plans and routines for the individual and crew for effective race preparation, racing and post race evaluation/ reflection.
- encourage regular use of mental skills.
- belief in winning.
- encouraging effective communication with the coach(es.)
- continue to develop (and maintain) mental toughness by racing in challenging situations (in training and in formal competitions.)

LIFESTYLE

- athletes should consider themselves full-time athletes and manage and organise their lives accordingly.
- provide continued access to specialised support such as sport psychologists, physiotherapists, nutritionists, physiologists and strength and conditioning experts.

COACHING

- NCCP RCA High Performance Coach.

TRAIN TO WIN 2

GOING FAST: TRAINING AND RACING SMARTER

2

OVERVIEW

The training, racing and recovery needs of an athlete who has been at the Train to Win stage for one or more quadrennial cycles are not the same as those for an athlete just entering the Train to Win stage. The focus should be on keeping the athlete injury-free and enjoying racing and training at the highest level, while maintaining (or improving) physical, technical, racing and ancillary capacities.

AGE: Athletes who have been in the Train to Win stage for one or more quadrennial cycles

KEY OBJECTIVES DEVELOPMENTAL AGE

Not applicable.

KEY OBJECTIVES ROWING SPECIFIC

- retain top athletes.
- continue to enjoy racing and training at the highest level.
- continue to race consistently well and win medals at World Cup, World Championships and Olympic Games and Paralympic Games.
- focus on recovery, regeneration and other services that can help athletes avoid career-ending injuries.

PHYSICAL TRAINING AND TRAINING VOLUMES

- athletes may benefit from longer and/or more frequent breaks or shifts in training (for example, some athletes may choose to take time – six to 18 months – away from high performance rowing in a post-Olympic year.)
- vary training stimuli and environments, such as training partners, training venues, coaches, boats, and workout structure. Sometimes change for the sake of change can stimulate improvements.

PSYCHOLOGICAL PREPARATION

- applying all the components of Mental Toughness and associated specific mental skills every day in training and in racing as individuals and crews.
- effective self-monitoring – rowers now have previous years records so should be in a strong position to get the most out of themselves on a daily basis.
- effective communication with coach.
- effective crew formation with good communication within the group.
- understanding and 'living' in the high performance environment.



- use of effective mental recovery strategies; individualised to the rower but making sure they are recovering well mentally as well as physically every day.
- believe in winning; develop a high level of self awareness/ understand of how to win after winning and how to win after losing – dealing with success and failure.
- include frequent and/or longer breaks or changes to avoid mental burn-out. Strive to keep things fresh and interesting.

LIFESTYLE

- include more frequent breaks or changes.
- at this stage, athletes should be encouraged to develop other areas of their life (work and family), to "keep things fresh," provide balance and ease the transition to post-high performance life.

TECHNICAL, EQUIPMENT, TACTICAL, COMPETITION, COACHING: as per Train to Win

COMPETITIVE FOR LIFE

(C4L)

OVERVIEW

Competitive for Life rowers train for specific competitions, devoting significant time and energy to training and competing, but they are not on the “high performance” track, nor are they full-time athletes. Rowing and competing at rowing may be important, but they are integrated into the athlete’s life with other commitments and interests.

Like A4L athletes, those who are C4L may have different athletic backgrounds and levels of skill. The C4L stage includes both older Junior rowers (those who are beyond the developmental stage that

defines Train to Train) and Senior rowers who do not have the desire or potential to become Train to Compete athletes. Competitive for Life may also include Masters age athletes who start rowing as adults and those who are retired high performance rowers.

C4L is distinguished from Learn to Compete/Train to Compete and Train to Win by 1) performance and 2) competitive goals and distinguished from Active for Life by goals. Many athletes will also move between being “Active for Life” and “Competitive for Life” as other demands and interests in their life change.

AGE: Athletes who are “Competitive for Life” will first diverge from those who aspire to high performance around the Learn to Compete stage, as rowing starts to demand a bigger time commitment. Athletes may move into Competitive for Life from Learn to Compete, Train to Compete or Train to Win stages.

The transition into Active for Life is largely based on individual’s goals and is not tied to developmental benchmarks, age or performance.

KEY OBJECTIVES DEVELOPMENTAL AGE

Not applicable.

KEY OBJECTIVES ROWING SPECIFIC

- enjoy racing and experience success.
- continue to improve technical skill and performance.
- maintain/improve rowing specific endurance, strength and speed.

PHYSICAL TRAINING AND TRAINING VOLUMES

- will vary depending on goals. To expect improvement in performance rowers should expect to do rowing specific training at least three to four times per week.
- incorporate cross training for interest, injury prevention and recovery.
- volume and intensity of training must fit with the time available for rest and recovery.
- as athletes age and/or face additional stresses they will require longer recovery between high intensity sessions to avoid overuse injuries and optimise training response.
- as athletes age, they should pay attention to maintaining flexibility and strength in order to avoid injuries and maintain/improve technique.

TECHNICAL

- continue to improve and refine technique.
- encourage training in a variety of boats and seats, including sculling and sweep.
- be aware of the impact on technique of age related declines in strength and flexibility.

EQUIPMENT

- adjust equipment and rigging to accommodate to changes in strength, flexibility and balance throughout life.
- well maintained equipment of appropriate size is required to achieve enjoyable, safe and injury free rowing.
- consider individualizing rigging for improved performance.

TACTICAL

- continue to develop and refine race strategies.

COMPETITION

- local, regional, provincial, national and international races, depending on goals.
- open water, head and sprint races.

PSYCHOLOGICAL PREPARATION

- continue to develop strategies to manage emotional responses around competition.
- continue to develop and refine the strategies that will contribute to competitive performance including skills in imagery, mental toughness, goal setting.

LIFESTYLE

- integrate training and racing into a lifestyle that includes other commitments and interests.
- recognise that changing responsibilities and commitments outside rowing may have an affect on training, recovery and performance.

ADAPTIVE

- adaptive races should be integrated into local/regional/provincial regattas regularly, including opportunity for adaptive and able-bodied rowers to race in the same boat.

ACTIVE FOR LIFE

(A4L)

OVERVIEW

Rowers who are Active for Life row primarily for fun, fitness, personal satisfaction, health, wellness and social reasons. This stage may include athletes of any age and with widely different athletic backgrounds and levels of skill. Because rowing can be performed at relatively low intensity, with low impact it is well-suited for lifelong participation from youth into senior years. A4L includes touring and open water rowing.

AGE: Transition into Active for Life is largely based on individual's goals and is not tied to developmental benchmarks, age or performance.

KEY OBJECTIVES DEVELOPMENTAL AGE

- maintain or improve overall fitness, including flexibility, aerobic capacity, strength.

KEY OBJECTIVES ROWING SPECIFIC

- fun, fitness, health and social.
- continue skill development.

PHYSICAL TRAINING AND TRAINING VOLUMES

- self determined.
- maintain active lifestyle through rowing.
- endurance, strength and flexibility training.
- encourage cross training to maintain muscle strength and flexibility and joint range of motion, particularly for muscles not much used in rowing.

TECHNICAL

- improve and refine technique for enjoyable, injury free rowing and the satisfaction of improving.

EQUIPMENT

- adjust equipment and rigging to accommodate changes in strength, flexibility and balance throughout life.
- well maintained equipment of appropriate size is required to achieve enjoyable, safe and injury free rowing.

ADAPTIVE

- even at moderate training levels, appropriate equipment continues to be important to maintain safe and injury free rowing particularly for athletes of AS and TA where overuse injury of the upper extremity may impact daily mobility.

With the reorientation of Sport Canada into the LTAD structure, a tremendous opportunity emerges for all sports to reorient themselves at their deepest levels. With some reflection, one sees that our sport of rowing is uniquely positioned to address the needs of people over their entire lifetime: in its practice, all physical systems are developed, maintained, and brought into balance in a low-impact, low-injury manner, while social, mental, and spiritual health needs are quietly yet powerfully met. Long-term interest is maintained through variety of boat type and the incessant technical challenge of mastery – in short, it's one of the few sports in existence that can holistically support health as people age. Thus, our sport's practitioners at every level would be wise to strategically align with the looming needs of our country's aging population by first perceiving our unique ability to provide a comprehensive, low-cost, preventative solution.

Anne Sproull,
Learn to Row Coordinator,
Vancouver Rowing Club

TACTICAL

- not applicable.

COMPETITION

- A4L athletes may choose to compete, but this is not their focus or primary reason for rowing.
- participate in informal Skills Events for fun and to hone boat handling skills.
- active for Life athletes may also choose to participate in touring and open water races.

PSYCHOLOGICAL PREPARATION

- use exercise as a form of stress reduction.

LIFESTYLE

- integrate rowing into an active and healthy life.

COACHING

- although identified in the RCA Coach Development Model, coach training has not been developed.
- this is an area of growth within RCA membership. With a large demographic aging, more support and work is needed in this area.

PRACTICAL IMPLICATIONS OF LTAD

LTAD HAS PRACTICAL IMPLICATIONS FOR ATHLETES,
PARENTS, COACHES, PROVINCIAL ROWING ASSOCIATIONS, AND CLUBS,
AS WELL AS FOR RECRUITMENT, THE REGATTA SYSTEM, AND EQUIPMENT.



ATHLETES/PARENTS

LTAD will provide a framework for athletes and parents to understand physical literacy and its importance for a healthy lifestyle and for success in competitive sport. It will help parents to understand physical, mental, cognitive, and emotional development and how these affect participation, training, and performance. LTAD will also help parents to understand the particular hydration, nutrition, and recovery requirements of growing children.

LTAD will provide athletes with a clear picture of the pathway(s) open to them and what they should, and should not, be doing at each stage of development. It will give athletes and parents more knowledge with which to advocate for the programs, coaching, equipment, regattas, and support services that are critical to long-term development. A development pathway that is seamless, laid out clearly, and based on a consistent set of principles will help everyone in the sport system to identify how they can best support the development of the athletes for whom they are responsible. Parents can help promote a balanced and holistic approach to athlete development by understanding what is developmentally appropriate at each of the LTAD stages.

COACHES

To be successful, LTAD requires highly skilled and educated coaches at the development level. Development coaches must understand how mental, cognitive, emotional, and physical development affect participation, training, racing, and recovery. They must understand and be able to apply the LTAD recommendations. LTAD will significantly influence the curriculum of the National Coaching Certification Program, including the material that is specific to rowing.

Canada's sport system needs to create the conditions that will ensure there are well-trained, well-paid, full-time coaches at the development level, not just the elite level. This will provide a foundation for future athletic excellence and for a physically active population.



CLUBS

As the backbone of the Canadian rowing system, clubs will be affected by changes to regattas, coaching, and equipment as a result of LTAD. In addition,

- LTAD will provide clubs with valuable guidance in developing successful Learn-to-Row, Junior, Senior, Masters, and Adaptive programs.
- physical and water literacy developed during the FUNdamentals and Learn to Train stages may make it easier for athletes to learn to row and affect how Learn-to-Row programs are structured and taught.
- clubs should consider forming partnerships with schools, recreation centres, and other sports to deliver programs that build water and boat skills during the Learn to Train stage.
- clubs can evaluate their programs based on LTAD and determine where they would like to align/change their programs based on their own club priorities.

EQUIPMENT

- the emphasis on learning to row in 4x and 2x and delaying the introduction of sweep rowing until the early L2C stage may require some clubs to adjust their fleets.
- athletes should learn and train in equipment that is appropriate for their size (height, weight, and proportions.) Boat fleets should include some equipment that is suitable for smaller, lighter bodies such as smaller hulls and shorter oars.
- boats should be rigged appropriately for the size, strength, and proportions of those using them.
- boats should give learners the “feel” of rowing in terms of balance, run, and rhythm.
- safety is of paramount importance. Rowing clubs and coaches will need to consider carefully how to provide equipment that facilitates learning, such as “tippy” boats, within a safe environment. Flipping is fine – provided the conditions are safe and there is proper supervision.

REGATTA SYSTEM

The regatta calendar and events influence, and in some cases drive, the way rowing programs are structured and run. To be effective, LTAD must be supported by a regatta system that reflects the principles on which it is based. A regatta system that supports long-term athlete development might, for example,

- focus on sculling events (1x, 2x, 4x) at the junior level, with sweep events introduced during the Learn to Compete stage.
- focus on small boats (1x, 2x, 2-) at the junior level, with big boat events offered for variety and fun.
- provide a variety of race experiences for athletes in the Train to Train stage.
- introduce lightweight events once athletes have stopped growing.
- be structured to encourage and allow development of general endurance during the Train to Train stage.
- be structured to recognise that up to and including the Train to Train stage, training and maturation should take precedence over performance.
- define event categories that, as much as possible, support training and racing based on developmental age.
- be structured so that all rowers can compete in regattas that match their skill levels and can experience success at some level, whether local, regional, provincial, or national. The regatta system should promote close racing and avoid situations where boats cross the line far apart. It should also provide rowers with challenges and a vision of the possibilities, particularly for those who want to race at the elite level.

Progress has been made in some areas such as inclusion of LTAD education in all of RCA's NCCP coach workshops. As well, Rowing Canada Aviron has completed a competition review with recommendations to adjust regatta structure and calendar. The immediate priorities are to communicate, educate and implement the recommendations based on this stage by stage approach, involving all partners and stakeholders.

Implementation

This revised document provides further insight and reflection on developing LTAD for rowing. It provides an overview of LTAD, defines the principles on which LTAD is based, outlines the framework of the stages and the key aims and elements of each stage, and highlights some of the practical implications for the Canadian rowing system.

In subsequent steps, Rowing Canada intends to

- develop and describe in detail the training, racing, and recovery programs for each stage, from Train to Train to Train to Win within the NCCP and other coach education opportunities.
- prepare separate supporting documents that will communicate the principles of LTAD and provide specific guidance for coaches, athletes, parents, and clubs.
- use LTAD to review the existing rowing system, identify gaps and weaknesses in the system and in the development pathway, and develop solutions that will support LTAD. The immediate priorities include a review of the regatta system and coach education.

We recognise that implementing LTAD will require changes to the regatta system, club programs, equipment, and coach education, and that clubs, regatta organisers, schools, and coaches will need support in its implementation. Some of these changes can be made quickly; others will be more gradual. Many of the changes are interdependent. For example, LTAD recommends that athletes learn to scull before learning to sweep, and that they learn in small boats. To implement this recommendation, some clubs will need to change their fleet of boats to include more 1x's, 2x's, 4x's, and 2-'s. This is expensive and can only be done gradually. In addition, it may require changes in boat storage. It must be coordinated with changes to the regatta system so athletes will have boats that match the events offered. Clubs will also have to consider how this recommendation and the shift in boat fleets will affect safety, program structure and timing, revenue generation, and their relationship with other water-users.

LTAD is a “work in progress.” It will be reviewed and adapted to incorporate new research, empirical evidence, and innovations. We welcome and will actively solicit feedback from coaches, club administrators, athletes, and others concerned about and affected by LTAD. However, we also recognise we need to “get on with it” if LTAD is going to benefit rowers. We want to develop a usable and useful plan that is based on the best available information, and then adapt it as necessary.

As Federal, Provincial and Territorial Governments continue to support and encourage a LTAD approach to athlete development and sport delivery, provincial rowing associations will play an important role in implementation by working with clubs to identify gaps and ways to align future programs.

With all of these plans, perhaps the most important element is ongoing proactive communication and education about LTAD.



WITH ALL OF THESE PLANS,
PERHAPS THE MOST
IMPORTANT ELEMENT
IS ONGOING PROACTIVE
COMMUNICATION AND
EDUCATION ABOUT LTAD.





conclusion

LTAD is about doing development right. It is about taking a long-term, clear, and systematic approach that focuses on athletes and what they need – at all levels. Rowers who benefit from the right training, racing, and support at the right time will have the foundation they need to reach their athletic potential and enjoy rowing throughout their lives. Good preparation is crucial to an athlete's success. LTAD is about extending the concept of good preparation to all stages and all aspects of athlete development.

LTAD allows all rowers and those who support them to see what they should (and should not) be doing throughout their development. It helps individual athletes to identify the pathway that suits them and their goals.

LTAD is a foundation for a rowing system that is successful in terms of both number of participants and the number of medals at the high performance level. It makes sense to invest in a framework that will develop athletes who enjoy rowing, succeed at the elite level, and stay involved in the sport for the long term.

"From high school through to the Olympic Games, every opportunity was well suited to my stage of development. I still had to take the steps, but they were well paced and challenging enough to maintain my interest. My story would have been different if I hadn't had these development opportunities, or if they had been presented in a different order, when I wasn't ready to take advantage of them. It is these well-paced steps that LTAD strives to offer Canadian rowers of all ages."

Jon Beare,
National team member, Olympian, coach and
vice president of Athlete Development, Rowing BC.

Annual competition calendar

	L2T	T2T	L2C	T2C Development & HP Stream	T2W	T2W2	A4L
Jan		Complementary sports					
Feb		Complementary sports Local erg races (6km & 100m)	Provincial erg 6km	Provincial erg 6km	Provincial erg 6km Domestic long distance races	Provincial erg 6km Domestic LD	erg
March		Complementary sports Local erg (6km & 100 m)	National erg 6km Provincial erg 2km	National erg 6km Provincial erg 2km	National erg 6km Provincial erg 2km Domestic long distance races	National Erg 6km Provincial Erg 2km Domestic LD races	erg
April		Inter Club (for those who can get on the water early)	National erg 2km Regional long distance races	National erg 2km	National erg 2km International long distance races	National erg 2km	Long distance races
May	Intra club	Inter Club	Regional long distance races	Regional long distance races Regional Talent Id camps in Yrs 1, 3 after Canada Games	Can AM Series (Long distance races) World Cup and/or Selection	World Cup and/or Selection	Long distance races
June	Intra club	Regional		Selection	World Cup and/or Selection	World Cup and/or Selection	Regional Sprint Races
July	Intra/Inter Club	Provincial	Provincial	Provincial World University Championships U23 Worlds	World Cup World University Championships Pan Ams & Commonwealth Championships	World Cup	Regional Sprint Races Provincial
August	Intra/Inter Club	Provincial	Henley Canada Games	Henley	Worlds/Olympics	World/Olympics	Henley Cdn Masters
Sept		Complementary sports & weekend rowing	Regional 2000m	Regional 2000m			FISA masters
Oct		Complementary sports	Junior/High School National Championships	Regional 2000m	Can AM Series 2k races		
Nov				CURC NCR	CURC NCR	NCR	
Dec				Transition phase			

Race Distance CHART

This chart provides race distances, the energy system being trained and it identifies the stage when it should be introduced based on the optimal windows of trainability (LTAD plan for rowing, pages 12 and 13).

Race Distance	Energy System	Starting Stage
100 metres	Anaerobic Alactic	Training to Train
500 metres	Anaerobic Lactic	Learning to Compete
1000 metres	Anaerobic Lactic	Learning to Compete
2000 metres	Anaerobic lactic/ Aerobic	Learning to Compete
4000 metres	Aerobic	Training to Train
6000 metres	Aerobic	Training to Train



GLOSSARY OF TERMS

Adaptation refers to the functional and/or morphological changes in an organism that are induced by a stimulus or a series of stimuli. The general patterns of adaptation are consistent amongst individuals and have been clearly delineated by physiological research. However, the degree of adaptation will depend on an individual's genetic endowment.

Ancillary capacities refer to the knowledge and experience base of an athlete. The ancillary capacities include warm-up and cool-down procedures, stretching, nutrition, hydration, rest, recovery, regeneration, mental preparation, and taper and peak. When athletes reach their genetic potential and physiologically cannot improve anymore, they can still improve performance by using the ancillary capacities to full advantage.

Canadian Sport for Life (CS4L) is a movement to improve the quality of sport and physical activity in Canada. CS4L links sport, education, recreation and health, and aligns community, provincial and national programming.

Chronological age refers to a person's age according to their date of birth.

Developmental age refers to an individual's stage of development, based on physical, emotional, social, and cognitive criteria.

Development refers to "the interrelationship between growth and development, in relation to the passage of time. The concept of development includes the social, emotional, intellectual, and motor realms of the child."

Fundamental movement (motor) skills refers to the set of movement skills that form the basis for all sports and physical activity.

Fundamental sport skills refers to the set of sport skills that form the basis for all sports.

Growth and maturation are often used together, sometimes synonymously. However, each refers to specific biological activities.

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

Maturation refers to "qualitative system changes, both structural and functional in nature, in the organism's progress towards maturity."

Long-term Athlete Development (LTAD) is a seven-stage training, competition, and recovery pathway guiding an individual's experience in sport and physical activity from infancy through all phases of adulthood.

Menarche refers to the onset of the first menstrual cycle.

Periodization refers to the structuring of short- and long-term

training, competition, and recovery periods to provide optimum performances at the required time or time series.

- **Single Periodization:** one preparatory and one competitive period within the year
- **Double Periodization:** two preparatory and two competitive periods within the year
- **Triple Periodization:** three preparatory and three competitive periods within the year
- **Multiple Periodization:** competing all year round while maintaining physical and technical skills
- **Mesocycle** is a portion of a program comprised of a predetermined number of microcycles, aimed at achieving a particular objective in accordance with the priorities of the phase/period of the yearly training plan. Usually a mesocycle features a training dominant or priority and is comprised of 2 to 4 micro cycles whose respective training loads may vary according to an ascending or alternating pattern. At the end of a mesocycle, test or competitions are usually scheduled to assess the extent to which training objectives have been achieved.
- **Microcycle** is a series of training sessions and recovery periods that spans a few days, usually a week. The sequencing of training sessions within a given time frame are based on their physiological, technical, and psychological demands and their associated fatigue, in order to optimise the amount of stress imposed on the athlete's organism. A succession of 2 to 4 microcycles usually constitutes a mesocycle.

Peak Height Velocity (PHV) refers to the maximum rate of growth in height.

Physical literacy is the mastering of fundamental movement skills and fundamental sport skills that permit a child to read their environment and control in a wide range of physical activity situations. It supports long-term participation and performance to the best of one's ability. Physical Literacy is the cornerstone of both participation and excellence in physical activity and sport. Ideally, physical literacy is developed prior to the adolescent growth spurt. It has been adopted as the foundation of the Sport for Life concept in Canada.

Sensitive periods of development refers to a stage in the development of a specific capacity when experience or training has an optimal effect on development. Physiologically, these are the periods during which an individual's body is most responsive to particular stimuli.

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

References

Alpine Integration Model. Alpine Canada Alpine, High Performance Advisory Committee, 1999

Balyi, I. Sport system building and long-term athlete development in Canada. The situation and solutions, in *Coaches Report*, Summer 2001. Vol.8, No.1, pp.25-28.

Bar-Or, O. (ed). *The Child and the Adolescent Athlete*. Balckwell Science Ltd. Oxford, UK, 1996.

Bloom, B. *Developing Talent in Young People*. New York: Ballantines, 1985.

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

Ericsson, K.A. and Charness, N. Expert Performance. *Its Structure and Acquisition*. American Psychologist, August 1994., pp. 725-747.

Malina, R.M. and Bouchard, C. *Growth, Maturation, and Physical Activity*. Champaign, Ill.: Human Kinetics, 1991.

Robertson, S. and Way, R: *Long-term Athlete Development: A Made-in-Canada Model*. Coaches Report, Vol.11.No.3, pp. 6-12.

Rushall, B. *The Growth of Physical Characteristics in Male and Female Children*. In Sports Coach, Vol.20, Summer, 1998. pp. 25 – 27.

Sanderson, L. *Growth and Development Considerations for the Design of Training Plans for Young Athletes*. Ottawa: CAC, SPORTS, Vol.10.No.2.1989.

Scammon, R.E. *The Measurement of the Body Childhood*. In Harris et.al., eds. *The Measurement of Man*. Minneapolis: University of Minnesota Press. 1930.

SportMap: A Blueprint for Sport Excellence. PacificSport, 2001.

Stafford, I. *Coaching for Long-Term Athlete Development*. The National Coaching Foundation, Coachwise, Leeds, 2005.

Tenner, J.M. *Growing Up*. Scientific American, 1973, 9.

Viru, A. *Adaptation in Sports Training*. CRC Press, Boca Raton, 1995. 310.p.

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



ACKNOWLEDGEMENTS

THE FIRST OVERVIEW OF THE LTAD PLAN FOR ROWING WAS PRODUCED BY A WORKING GROUP THAT INCLUDED:

Istvan Balyi	National Coaching Institute, PacificSport Victoria and Advanced Training and Performance Ltd.
Ian Moss	Executive Director, Rowing Canada Aviron
Dr. Volker Nolte	Head men's coach and assistant professor, University of Western Ontario
Rebecca Orr	Domestic Development Officer, Rowing Canada Aviron
Terry Paul	National Development Coach, Rowing Canada Aviron
Alan Roaf	High Performance Director, Rowing Canada Aviron
Brenda Taylor	World and Olympic Champion
Carolyn Trono	Director of Coach Development, Rowing Canada Aviron
Richard Way	CS4L Project Lead

A SECOND GROUP WAS CONVENED TO UPDATE THIS DOCUMENT AND FURTHER DEVELOP IDEAS ASSOCIATED WITH LTAD AND ATHLETES WITH A DISABILITY. THIS GROUP CONSISTED OF:

Brenda Taylor	Victoria City Rowing Club
Martin George	RCA Domestic Development Officer - Adaptive
Colleen Miller	RCA Domestic Development Officer
Courtney Pollock	FISA Classifier
Rebecca Thomas (Orr)	FISA Classifier
Colin Higgs	LTAD Expert
Carolyn Trono	Director of Coach Development, Rowing Canada Aviron

ADDITIONAL REVIEWERS:

Peter Cookson, Jeff Dunbrack, Kirsten Barnes

WE THANK THOSE COACHES AND OTHER EXPERTS WHO CONTRIBUTED THEIR IDEAS, EXPERTISE AND COMMENTS IN MARCH 2005 AND IN 2009/10.

Laryssa Biesenthal, Rowing Canada Aviron	Courtney Pollock, Ontario	Howie Campbell, British Columbia
Craig Pond, British Columbia	Rick Crawley, British Columbia	Gwen Prillo, Sport Canada
Carol Love, Ontario	Alan Roaf, Rowing Canada Aviron	Walter Martindale, Alberta
Bob Sawler, Nova Scotia	Chuck McDiarmid, Manitoba	Karol Sauvé, Quebec
Ian McFarlane, Ontario	Mike Spracklen, Rowing Canada Aviron	Siobhan McLaughlin, Saskatchewan
Brenda Taylor, British Columbia	Al Morrow, Rowing Canada Aviron	Anne Renée-Thibault, Quebec
Dr. Volker Nolte, Ontario	Lesley Thompson, Ontario	Kim Norris, New Brunswick
Mike Thompson, Ontario	Rebecca Orr, Rowing Canada Aviron	Carolyn Trono, Rowing Canada Aviron
	Terry Paul, Rowing Canada Aviron	

Writer Brenda Taylor **Translation** Hélène Thomas **Design** Barbara Moore
Production Co-ordinators Carolyn Trono, Rebecca Thomas, Barbara Moore

Photo credits

Page 3 Clockwise from top right: Tracey Sanders, ORP.ca; Katherine Herman; Kevin Light; Fred Loek; Renate Hodges; and Joel Rogers.	Page 18 Fred Loek.
Page 4 Top: Jackie Skender; bottom, Renate Hodges.	Page 21 Renate Hodges; bottom, courtesy Rowing BC.
Pages 6 and 7 . . . Canadian Press.	Pages 22 and 23 . . . Kevin Light.
Page 8 Clockwise from top left: Fred Loek; Robin Duncan; Katherine Herman.	Page 24 Joel Rogers.
Page 9 Tom Hawker.	Page 25 Jackie Skender.
Pages 10 and 11 . . . Katherine Herman.	Page 27 Robin Duncan.
Page 14 Renate Hodges.	Page 30 Joel Rogers.
Page 17 Fred Loek.	Page 31 Fred Loek.
	Pages 32 and 33 . . . Clockwise from top left: Lindsey Boland; Fred Loek; Joel Rogers; Kevin Light.
	Page 35 Unknown.
	Page 37 Christine Eastgaard.



www.rowingcanada.org



ROWING

CANADA

AVIRON

www.rowingcanada.org

We acknowledge the financial support of the Government of Canada through Sport Canada, a branch of the Department of Canadian Heritage.

Nous reconnaissons l'appui financier du gouvernement du Canada par l'entremise de Sport Canada, une direction générale du ministère du Patrimoine canadien.

Canada