



Sport Climbing

For Sport, For Life

LTAD

Long-Term
Athlete Development



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Foreword:

This document is a framework for the Sport Climbing community: coaches, officials, facility operators, and administrators, to guide development of programs for all athletes, in both recreational and competitive settings. The recommendations made here are the result of collaboration by Canada's Sport Climbing experts, an initiative of CEC, Climbing Escalade Canada. CEC recognizes a need for greater continuity within the Sport Climbing community and the broader sport system to provide all of our athletes with an equal opportunity to achieve great results, whether in local events or at international levels. This is another giant step forward for Sport Climbing in our nation.



Sport Climbing is about finding a solution to a physical and mental puzzle. Solving that puzzle is based in large part on motor learning and the building up of one's repertoire of physical movements. In a climbing competition, the moves increase in complexity as you move up the wall, putting more and more pressure on the body and mind to find a solution within seconds. Finding that solution is also greatly affected by the participant's mental stamina. Since it is a point system, where you fall dictates your score. In the discipline of Lead Climbing, qualification rounds last only minutes per climb on two qualifying routes, then moving on to semi and final rounds, where you have one single route to climb, again with a time limit. In Bouldering the climber will have up to 5 problems: shorter routes, 12 moves or less during qualifying, semi-finals and final rounds, with several attempts on each problem but again with a limited time. In Speed Climbing, the

athlete will race up 10 metre or 15 metre standard format routes previously practiced to qualify for a semi and final round. Speed records are currently under 6 seconds. For success in such a demanding sport, proper long-term development is essential; a climb may only take a few seconds in competition, but is the culmination of rigorous training over a long period of time. This Sport Climbing LTAD framework is a guide to the long climb of athlete development.

Sport Climbing is relatively young as an organized sport in Canada. This Long-Term Athlete Development (LTAD) framework is intended to support grassroots operations and established organizations, as a tool to create a solid foundation for athlete development programs, and also to maintain continuity within the sport nationwide. Ultimately the climber is the only participant that is accountable for their performance, yet it is the Sport Climbing community which sets the conditions for performance. We envision the LTAD as a way to better prepare our athletes for all competition formats.

What is the scope of this document?

This document is the foundation for athlete development in both recreational and competitive indoor climbing. Areas of focus include Bouldering, Speed and Difficulty (top rope or lead depending on categories). A focus on these three areas covers the current needs for indoor Sport Climbing in Canada. There are other aspects of the climbing world that warrant mention but also require further investigation and review in relation to LTAD, such as Outdoor Sport Climbing, Traditional Climbing, Outdoor Bouldering and Ice Climbing. As well, there is the development of LTAD documentation for para-climbing, and its integration within the sport in Canada. These areas will be developed in future as Sport Climbing in Canada continues to grow.

To support the vision of climbing in the 2020 Olympics and beyond, facility owners, coaches and other sport leaders can use the fundamental concepts of LTAD presented here to build a solid foundation for the development of Sport Climbing in Canada. The Sport Climbing LTAD framework is a stage-based approach to athlete development, with 8 stages from birth and early childhood through to high performance and lifelong participation. Although currently most adult climbers participate in the sport recreationally, we now have a new generation of climbers that seek higher possibilities within the sport; Stage 7, “Winning for a Living” is reserved for these high performance adult climbers who are pursuing climbing professionally. By following this stage-based framework for development of our athletes, we can put in place aligned coaching, competition and other programs to expand and improve the quality of participation in the sport. LTAD is also a stepping stone to other exciting opportunities in Canada and internationally. Competition climbing now has a World Cup series, World Championships, is part of the World Games, and has been included in World University Games (Universiades), and World Beach Games. A major milestone is that competition climbing is also one of the five sports to be included in the Tokyo 2020 Olympic Games. This inclusion could potentially lead to the inclusion of Sport Climbing in the Pan American Games as well. The International Federation of Sport Climbing (IFSC) and the competition community is very excited about this and is working diligently to ensure that climbing competitions meet Olympic standards.

The Sport for Life Society (Canadian Sport for Life) is the architect of LTAD in Canada, and the source of numerous resources used in this guide. Some concepts that have been integrated into the Sport Climbing LTAD include Sport for Life’s Mental Fitness LTAD document, and the Aboriginal Sport for Life, Participant Development Pathway. While it addresses the needs of Aboriginal participants, it also contains valuable information for all sport enthusiasts. Sport for Life resources, including the LTAD frameworks of all other sports in Canada, can be found at sportforlife.ca.



Key Objectives of Sport Climbing's LTAD

Climbing Escalade Canada has developed this framework in order that:

- 1)** Clubs and coaches are provided with a developmentally appropriate framework for the development of physical, technical, tactical, mental and lifestyle skills.
- 2)** National, Provincial and Local competition structures are aligned to LTAD, to provide appropriately scheduled and formatted competitions through an athlete's career.
- 3)** Better skilled and more athletic climbers will be able to reach the highest levels of performance, and more climbers will continue in the sport to ages where they are able to reach maximum potential as well as to enjoy the sport in later years.
- 4)** Coaches and administrators are supported in their primary roles, which is to create a sport experience that provides each young participant with the opportunity to achieve success to their highest capabilities, and to continue a life of active living. This document also provides guidelines for the parents of young climbers.
- 5)** Climbing is not seen as an early specialization sport, but rather as a Late Specialization: Early Engagement, Kinesthetic sport. This is especially the case in the individual disciplines; Bouldering, Lead Climbing (referred to as Difficulty) and Speed. (see 10 Key Factors influencing LTAD)
- 6)** Developing athletes avoid participation in competitions that are not appropriate for their age and stage, and event organizers reconsider the format of their events, to ensure the right events are provided for developing climbers. Currently, most recreational competitions do not offer youth specific climbs and as a result younger athletes are not as successful and are put at risk for injury.
- 7)** Adult training methodologies are not imposed on children and youth.
- 8)** Athletes, coaches and parents are aware of Fundamental Movement Skills (FMS) and the importance of Physical Literacy (PL) at the early stages of development, and understand how to remedy gaps in PL in later years.
- 9)** Athletes, coaches and parents are aware of the 10 key factors of LTAD: Physical Literacy, Specialization, Age, Trainability, Intellectual-Emotional and Moral Development, Excellence takes time, Periodization, Competition, Sport System Alignment and Integration, and Continuous Improvement - Kaizen. (see 10 Key Factors influencing LTAD)
- 10)** Elite coaches are encouraged to work with younger athletes to build a stronger foundation for later stages.
- 11)** Opportunities are created for athletes with disabilities to be integrated within our sport and encourage a lifelong interest in Sport Climbing.

10 Key Factors Influencing LTAD in Sport Climbing

Excellence takes time: It can take 7,000 to 10,000 hours, spread over seven or more years, to attain mastery in a sport. Rushing the process can result in injury, burn-out or loss of interest.

LTAD states that “free play at school also contributes to thousands of hours of athlete training. Enroll children in minor sport programs each season, and have them try a variety of sports, positions, and events. Be sensitive to their preferences, but avoid premature specialization in one sport.” Sport climbing is a very social sport and it creates opportunities for skill development to happen organically. By allowing climbers to learn and try at their own pace, and structuring programs appropriate to what young climbers are able to do, we can promote a love for, and profound knowledge of climbing.



Physical Literacy is imperative to our health. It is defined as having the movement competence, confidence and motivation to participate in physical activity, and begins with the mastering of fundamental movement skills such as agility, balance and coordination (ABCs). Sport climbing is similar to other acrobatic sports, such as gymnastics, in developing the ABCs, however to become truly physically literate our athletes need to engage in a variety of other activities and sports during their developmental years to become well rounded athletes in the future.

Specialization: Specialization means selecting a single sport, or position or role within a sport, for full-time focus. Sport Climbing is recognized as an early introduction, late specialization sport. Most elite level climbers started around 10 years of age; climbing sequences and movements can be very complex so a high degree of experience in various movement patterns and variations is greatly beneficial to the emerging climber. While it is beneficial to begin learning early, premature specialization (single focus) may lead to injury or burn-out, specializing early does not guarantee success, and can work against it.

It is recommended that athletes specialize during the Train to Compete stage which falls into the Youth A division 14 – 16 years old, at which time they may also compete in the adult circuit. It is recommended that athletes continue to participate in a variety of activities until late into the Youth A division, around 16 years of age. This also means not to focus on a single climbing discipline, but to practice as much as possible, the three competition disciplines (boulder, lead and speed) as well as outdoor climbing. This can be achieved with a well-balanced climbing training program that respects the developmental age and stage of each participant. It is also possible to succeed with a later introduction, however late starters need to be patient and focus on progressive hand strength work, not to over stress their musculoskeletal system too quickly.

Developmental Age: Chronological age (months, years) is not a reliable way to determine whether an athlete is ready for a given type or intensity of training or competition. Athletes may be as much as 4 years apart, in terms of biological development, around the time of puberty. Developmental age is a function of growth, relative to key events such as the onset of the growth spurt, and provides a better point of reference for determining training, competition and recovery needs.

In Sport Climbing, muscular strength and power developing after puberty are as important as skill and the ABCs, which develop quickly before puberty. Hand and finger strength play a key role in a participant's ability to do the intended movements during a climb, and stressors on the hands need to be considered, especially during growth spurts and until growth plates are fully formed, at which time hand training regimes can be implemented. Sport climbing is also complex in that equipment changes and thus affects whether height is an advantage or disadvantage; this relates to all disciplines, boulder problems, routes and speed climbing.

Current competition divisions are based on chronological age, not developmental age. To compensate, route setters tend to look at averages or norms, helping to level the playing field from a physical standpoint. Provincial Sport Organizations (PSO) and our National Sport Organization (NSO), Climbing Escalade Canada, are considering how mental and emotional development of young athletes can determine readiness for competition as well. This may include eliminating youth D athletes, 9 and 10 year olds, from national championships. CEC is also re-evaluating the competition program to see how it aligns with the developmental age of participants. Coaches, athletes and parents should understand that at certain LTAD stages (Youth B division in particular) results in competition are not the best benchmarks for skill, progression and potential, as youth competitions include participants at different developmental periods in their growth.



Sensitive Periods and Windows of Trainability - the 5 S's:

The five S's are stamina (endurance), strength, speed, skill, and suppleness (flexibility).

Stamina: The ideal period to train stamina is the onset of, Peak Height Velocity (PHV) 10 to 11 years (females), 12 to 13 years (males); in sport climbing stamina is needed when one must strive to increase the difficulty of moves, the number of movements and time between movements without rest.

For strength the ideal window also relates to Peak Height Velocity (PHV), which occurs at the growth spurt. The strength window for females is after PHV and before menarche, whereas for males it is 12 to 18 months after PHV. Tracking PHV and coaching according to development is essential for effective athlete development. Overall body strength falls in line with other sports with respect to development, however hand strength development must consider the athlete's growth spurt and growth plate development. Once the growth spurt is complete and growth plates are closed, additional weight can be introduced, and specific hand training can commence, generally around the age of 16. Over-stressing the hands before the growth spurt is complete can result in irreversible injuries, leading to chronic health problems or possibly ending an athlete's career.

Speed has 2 windows of optimal training. The first window (unloaded strength, or quickness) is key for short duration, low intensity activities (up to 5 seconds). This window occurs around 6 to 8 years (females), or 7 to 9 years (males). This fits with key speed tactics like "dynos" (dynamic jumps) in various hand and foot combinations to various size holds, different distances and directions. The second speed window is for development of 5 - 20 second, high intensity, anaerobic efforts, and occurs around 11 to 13 years (females), 13 to 16 years (males) after PHV. This is relevant to specific training for Speed climbing.

Skill development happens continuously, however during the ideal windows (8 to 11 years old for females, and 9 to 12 years old for males), young athletes are developmentally ready to learn skills quickly. Coaches may tend to focus on strength and not skill acquisition at this time, however by offering frequent opportunities to learn different skills, even if they are not required for competition purposes, athletes will build their movement repertoire and be better prepared for later competitions. An example is learning to lead climb before they reach youth B division.

The optimal window for suppleness (flexibility) is between the ages of 6 to 10 years old. Coaches must allocate more time to flexibility work during this period, and then support athletes to maintain their flexibility afterward.

Mental, Cognitive and Emotional Development: In many sports, coaches tend to consider the physical before the mental. In climbing, mental state is an important factor in your performance; a climber's mental state has a direct correlation to their capabilities and limitations. Mentally, climbers need to be in the moment, dealing with pressure, displaying resilience, adapting to the unknown. Cognitively, focus, format, analyzing, route reading, and tactics related to the format of the event or training depend on creativity and exploration. Emotionally, the ability to control emotions which arise from success and failure, and the ability to learn how to manage these in the future, demand a level of insight and maturity. Optimal athlete development depends on the introduction and training of these capacities according to the developmental readiness of each athlete.

Periodization means developing annual and multi-year plans, appropriate to the age and LTAD stage of the athlete, for optimal training, competition and rest and recovery. A properly periodized plan includes a plan for monitoring growth and development and key performance factors, and modifying the plan that caters to these factors.

One component of this is selection of competitions, including "decisive" competitions where performance is expected versus developmental competitions for which the athlete does not need to peak. For some young athletes, the main event of the year may be Provincial Championships, while for Climbing for a Living athletes it will be World Championships or other International events. Currently, International competitions do not align with our local, Provincial and National cycles, and there is a gap after National Bouldering of 3 to 4 months before qualifying athletes compete again. CEC must work with IFSC to manage the National event schedule to help our international level climbers be better prepared.

System Alignment and Integration: To achieve the best results for our athletes, all community, club and school sport programs must work together. CEC, Sport Climbing PSOs and clubs must work to the same plan. Facility owners and operators need to inform the public about climbing, and offer appropriate programs and services to develop all climbers, young and old, recreational or competitive. System alignment means working to ensure that all partners understand and fulfill their role within the overall vision and plan for Sport Climbing in Canada.

Climbing is not yet well known as a competitive sport. Our system must aim to find ways of introducing and including climbers into the sport, and then to training and competition, in ways appropriate to their LTAD stage. Speed climbing, for example, is one of the most accessible and easy to understand disciplines, but is not offered in most facilities. Adults may find many friendly format bouldering competitions hosted at local gyms, yet there is a gap in reaching potential competitive climbers between the ages of 13 to 16. College and university competition events would be another great opportunity to introduce athletes to the sport. To build Sport Climbing, we must all work together.



The Eight Stages of Sport Climbing LTAD

LTAD is a multi-stage framework describing the path of athlete development. For the Sport Climbing framework some stage names have been modified from those used by Sport for Life:

1. **Active Start:** Birth to age 6
2. **FUNDamentals:** Age 6 to 8 (females) or 9 (males)
3. **Learn to Train:** Age 9 to 11 (females) or 12 (males)

Stages 1, 2 and 3, from birth to the onset of the growth spurt in puberty, emphasize development of physical literacy so children have the basic movement skills and sport skills to be successful in sport and stay active for life. Physical literacy also provides the foundation for those who choose to pursue elite training in one sport or activity after puberty.

4. **Train to Train:** Age 11-15 (F) or 12-16 (M)
5. **Learn to Compete:** Age 15-17 (F) or 16-18 (M)
6. **Train to Compete (Sport Climbing: Learn to Win):** Age 16 and older
7. **Train to Win (Sport Climbing: Winning for a Living):** Age 18 and older

Stages 4, 5, 6 and 7 provide training and competition for athletes who want to specialize in one sport, maximize physical, mental and emotional development, and work toward the highest levels of competition.

8. **Active for Life:** Any age after the growth spurt.

Stage 8 is about staying Active for Life through lifelong participation in competitive or recreational sport or physical activity. Athletes can leave the excellence pathway to enter Active for Life, or continue as recreational climbers after puberty.



Three Streams of Sport Climbing: Recreational, Intermediate, Advanced

In practice, there are 3 Streams of sport climbing: Recreational, Intermediate and Advanced levels for Bouldering, Lead and Speed are primarily separated by the number of training days, the intensity/duration/frequency of the training session and expectations of the program. Alongside the expectation of the development in the technical and physical ability of the athlete, this would coincide with speed, on-sight and flash level of the athlete. Mental and tactical training is also applicable at all levels of engagement in the sport; however there is a much greater focus on this for the advanced and elite climbers. Although the LTAD does not explicitly suggest the number of training hours and intensity for a Recreational athlete vs an Advanced or Elite athlete, it is expected that programming for recreational participants includes fewer hours per week with less intensity and minimal focus on competition. A recreational athlete may never participate in sanctioned competitions or may do so at the local level. As well, qualifying for Provincial and National level events will become more challenging, due to the increased popularity of the sport in Canada. Refer to the Competition Categories chart for further information on page 11, as well as the Athlete Development Matrix (ADM) on page 12 which summarizes the LTAD stages for Sport Climbing.



Competition Categories

Sport Climbing is separated into 3 disciplines, Bouldering, Lead and Speed. Lead is referred to as Difficulty in competition, but also stems from Top Rope climbing, a division not eligible in all international competition. Youth Divisions separate male and female competitors in each division, and currently after Youth D each competitor resides within a category for 2 years. Current Sport Climbing categories are:

CATEGORY	AGES	LTAD STAGE	LOCAL TO RECREATIONAL	PROVINCIAL TO INTERMEDIATE	NATIONAL TO ADVANCED	INTERNATIONAL TO ELITE
YOUTH D	9-10	LEARN TO TRAIN	TOP ROPE, BOULDERING SPEED (ADAPTED)	TOP ROPE, BOULDERING SPEED (ADAPTED)	DOES NOT COMPETE	DOES NOT COMPETE
YOUTH C	11-12	LEARN TO TRAIN & TRAIN TO TRAIN	TOP ROPE, BOULDERING, SPEED (ADAPTED)	TOP ROPE, BOULDERING, SPEED (ADAPTED)	TOP ROPE, BOULDERING SPEED (COULD BE REPLACED BY A REGIONAL EVENT)	HAS COMPETED IN THE PAST AT PAN AMERICAN CHAMPIONSHIPS BUT SHOULD NOT BE INCLUDED IN FUTURE
YOUTH B	13-14	TRAIN TO TRAIN	LEAD, BOULDERING, SPEED	LEAD, BOULDERING, SPEED	LEAD, BOULDERING, SPEED	ALL SINGLE DISCIPLINES, AND COMBINED CONTINENTAL & WORLD YOUTH CHAMPIONSHIPS
YOUTH A	15-16	TRAINING TO COMPETE	LEAD, BOULDERING, SPEED	LEAD, BOULDERING, SPEED	LEAD, BOULDERING, SPEED	ALL SINGLE DISCIPLINES, PLUS COMBINED AT CONTINENTAL & WORLD YOUTH CHAMPIONSHIPS, WORLD CUPS: LEAD, SPEED & BOULDERING COMBINED AT YOUTH OLYMPIC GAMES
JUNIOR	17-18	LEARNING TO WIN	LEAD, BOULDERING, SPEED	LEAD, BOULDERING, SPEED	LEAD, BOULDERING, SPEED	ALL SINGLE DISCIPLINES, PLUS COMBINED AT CONTINENTAL & WORLD YOUTH CHAMPIONSHIPS, WORLD CUPS & WORLD GAMES: LEAD, SPEED AND BOULDERING COMBINED AT OLYMPIC GAMES
OPEN	16 PLUS	LEARNING TO WIN & WINNING FOR A LIVING	LEAD, BOULDERING, SPEED	LEAD, BOULDERING, SPEED	LEAD, BOULDERING, SPEED	ALL SINGLE DISCIPLINES, PLUS COMBINED AT CONTINENTAL & WORLD CHAMPIONSHIPS, WORLD CUPS & WORLD GAMES: LEAD, SPEED & BOULDERING COMBINED AT OLYMPIC GAMES
	ANY AGE	ACTIVE FOR LIFE	TOP ROPE, LEAD, BOULDERING, SPEED (RECREATIONAL)	NON-SANCTIONED EVENTS	NON-SANCTIONED EVENTS	DOES NOT CURRENTLY EXIST

Athlete Development Matrix



STAGE 1
ACTIVE START
0 TO 6 YEARS

AGILITY, BALANCE,
COORDINATION,
SPEED

BASIC
INTRODUCTION
TO CLIMBING

EXPLORING
CHALLENGES

KEEP IT FUN!

FAMILY PLAYS
A KEY ROLE



STAGE 2
FUNDAMENTALS
GIRLS: 6 TO 8 YEARS
BOYS: 6 TO 9 YEARS

MOBILITY,
FLEXIBILITY

BASIC ROUTE
READING

POSITIVE
REINFORCEMENT &
ENCOURAGEMENT,
CONCEPT OF
OVERCOMING
CHALLENGES

SIMPLE RULES &
ETHICS OF SPORT
& COMPETITION
FORMATS

DEFINE BEING A
GOOD TEAMMATE



STAGE 3
LEARN TO TRAIN
GIRLS: 8 TO 11 YEARS
BOYS: 9 TO 12 YEARS

BODY WEIGHT
STRENGTH
TRAINING

REFINE CLIMBING
SKILLS & TEACH
PRACTICE SKILLS

PERSEVERANCE,
CONFIDENCE,
MENTAL
PREPARATION

DEFINE BASIC
COMPETITION
PRINCIPLES,
COMPETITION
SIMULATION
TRAINING

DEFINE BEING A
GOOD TEAMMATE



STAGE 4
TRAIN TO TRAIN
GIRLS: 11 TO 14 YEARS
BOYS: 12 TO 15 YEARS

MUSCULAR
ENDURANCE, INTRO
TO CALISTHENICS,
UPPER BODY
STRENGTH, CORE
STABILITY

INDIVIDUALIZED
APPROACH
TO ADDRESS
STRENGTHS &
WEAKNESSES, LEAD
& SPEED CLIMBING

GOAL SETTING,
IMAGERY,
RELAXATION,
PATIENCE & SELF-
CONTROL, FOCUS

DIFFERENT
INDIVIDUAL
COMPETITION
TACTICS, PACING/
REST/RECOVERY

MINDFULNESS AND
SELF-AWARENESS
CONCEPTS



STAGE 5
TRAIN TO COMPETE
GIRLS: 13 TO 18 YEARS
BOYS: 15 TO 18 YEARS

FOREARM &
FINGER STRENGTH,
OPTIMIZING
TAPERING, YEAR
ROUND TRAINING
METHODOLOGY

CLIMBING SKILLS
UNDER COMPETITIVE
CONDITIONS & AT
HIGH INTENSITY

PERSONAL
RESPONSIBILITY IN
DECISION-MAKING,
PRE- COMPETITION
PREPARATION,
ANXIETY CONTROL

EVENT SPECIFIC
TACTICAL
PREPARATION,
AGGRESSIVE
VS PASSIVE
STRATEGIES, ADAPT
TO DIFFERENT
SITUATIONS

IDENTIFY "OUTSIDE"
INFLUENCES,
PROVIDE TOOLS
TO HELP MANAGE
CHANGING
RELATIONSHIPS



STAGE 6
LEARNING TO WIN
18+ YEARS

STRENGTH, POWER

DEVELOP ABILITY
TO IMPROVISE WITH
SKILLS

INDEPENDENT
DECISION MAKING,
EVALUATING ADVICE,
COPING STRATEGIES,
PROMOTE THE WILL
TO WIN

EFFECTIVE
COMPETITION
STRATEGIES, ADAPT
STRATEGIES TO
SITUATION

DEALING WITH
CAREER/ATHLETICS,
TRANSITION FROM
COMPETITIVE
ATHLETE TO COACH/
OFFICIAL OR
RECREATIONAL



STAGE 7
WINNING
FOR A LIVING
18+ YEARS

CONSISTENCY,
VISUAL ACUITY

VISUAL CLIMBING
TECHNIQUES BASED
ON TERRAIN:
DIHEDRAL, CORNERS,
PHYSICS & HOW TO
STABILIZE MOTION,
MOMENTUM

CONFIDENCE IN
PERFORMANCE

EVENT FORMAT
STRATEGIES USING
ESTABLISHED
PROCESSES

ALTHOUGH AN
INDIVIDUAL
SPORT, TRAINING
WITH OTHERS IS
VERY IMPORTANT



STAGE 8
ACTIVE FOR LIFE
ALL AGES

DEVELOP SKILLS
APPROPRIATE TO
AGE & STAGE OF LIFE

DEVELOP SKILLS
DEPENDING UPON
AGE & ABILITY

ASPECTS OF
CLIMBING
THAT SUPPORT
OVERCOMING
CHALLENGES
THROUGHOUT

BASED ON
PERSONAL GOALS
AND LEVEL OF
INVOLVEMENT IN THE
SPORT

RECREATIONAL
INVOLVEMENT,
BEING PART OF A
COMMUNITY OF
CLIMBERS

Stage 1: Active Start

Ages:

0-6 Years

Description:

- Infants and young children grow rapidly, and given a rich environment and opportunity to explore, they develop mental, physical and movement abilities quickly.
- Growth and development is enhanced through playful exploration of risks and limits in safe environments.

Activities Should Include:

- Unstructured physical activity, this is active play for at least 60 minutes every day for toddlers and preschoolers. Toddlers and pre-schoolers should not be sedentary for more than 60 minutes at a time except while sleeping
- Instruction to promote safety when climbing
- Activity regardless of the weather
- Fundamental movement skills in all four movement environments: land, water, air, snow and ice. Fun, logical progressions with enough repetition so children can develop skills
- Participation in activity and later, sport programs that focus on improving movement skills such as running, jumping, twisting, kicking, throwing, and catching. These motor skills are the building blocks for more complex movement in sport and climbing
- Multiple opportunities for success, to help children feel competent and comfortable participating in a variety of fun and challenging sports and activities
- Games that are non-competitive and focus on participation
- Activities that are gender-neutral and inclusive
- Instructor to class ratios appropriate for age of participants
- Introduction to relaxation techniques for further enjoyment

Objectives of this stage are to develop fundamental movement skills, and make play and physical activity fun, exciting and an essential component of a daily routine. Develop Agility, Balance, Coordination and Speed (ABCs). Provide every young child with a foundation of appropriate movement and risk management skills, which can later be used for sport climbing. Climbing is a fundamental movement pattern, but climbing must be combined with other fundamental movements to develop general physical literacy.



Effective Learn to Climb Programs Should Offer:

- Elements that help children build confidence and positive self-esteem
- Many different movement based activities to build strong bones and muscles, improve flexibility, develop good posture and balance, reduce stress and improve sleep
- Programming that helps children learn to move skillfully and enjoy being active
- Prepared and enthusiastic instructors with expertise working with this stage
- A balance of repetition and progression from class to class, with a mid and end of session progress report on individual progress. Do not compare to other participants
- Tracking of specific skills from session to session
- Key climbing skills include: demonstrating balance with all 4 points on the wall, pulling/moving 3 points on the wall, ability to follow instruction through mimicking/after demonstration/when verbally instructed, letting go/jumping/falling, looking at feet, static movement control
- Appropriate level of challenge for each climber and high ratio of activity to rest in class time
- Equipment swaps or rentals for programs as this is a period of rapid growth and children will outgrow equipment to ensure that all children have access to the equipment they need to be active

Health & Medical Considerations:

Although this is a period of primary introduction to the sport, it is important to consider medical considerations at this stage and as well as beyond. Instructors and sport leaders must be able to identify various types of trauma and injury, and understand injury management and/or when to seek appropriate medical care and treatment.



- Musculoskeletal trauma: Fracture, dislocation of joints, tendon ruptures
- Torso/Multi-system trauma: Blunt or penetrating head injury, concussion
- Dermatological: Tears, blisters, wounds, hand/foot care, sunburn

Stage 2: Fundamentals

Ages:

Male 6-9 years

Female 6-8 years

Objectives of this stage are: Practice and master fundamental movement skills. Develop fundamental sport skills, by integrating fundamental movement skills in sport situations. Continue to develop physical literacy in the four basic environments (land, water, air, snow/ice) through a wide variety of activities and sport experiences. Most of all, provide FUN activities, games and learning experiences that build movement competence and confidence.

Description:

- Continue to enjoy daily play and physical activity
- Begin enjoyable, challenging and progressive climbing sessions.
- An emphasis on flexibility to develop and/or maintain an optimal range of motion in combination with the introduction of whole body own-weight strength development begins in this Stage
- Supervised sessions to minimize risk of injuries
- Introduce simple rules involving safety and etiquette

Important For:

- Efficient technique with an emphasis on correct body position for each movement(s) performed, to develop efficiency of movement
- As the first window of trainability for speed development occurs in this stage, focus on agility, quickness and short quick (speed) movements in a multi-directional manner
- Basic movement skills agility, balance, coordination
- Running, throwing, jumping and catching
- Strength development using own body weight
- Fun games to develop progressive movement patterns that support more complex movements later
- Climbing safety and building of movement skills repertoire

Training Sessions:

- 1-3 sessions per week, 0.5-1 hour per session
- Volume based climbing with low intensity activity focus, movements should vary
- 30 to 60-minute physical activity sessions on non-climbing days
- Continue with a high rate of success activities
- Should include non-climbing activities to aid the development of ABCs
- Encourage team sports to further develop ABCs

Competition:

- No formal competition should be introduced; events should be social and supportive
- Participation in "home" gym competitive events with introduction of rules, ethics and sportsmanship
- Avoid identifying top or worst performers and focus on achievement, encourage healthy competition in the form of personal improvement

Venues:

- Viewing, sanctioned or unsanctioned local youth competitions
- Home gym events
- School and community programs



Activities Should Include:

Physical:

- Physical development and mobility exercises on or off the wall
- Appropriate running, jumping and throwing skills development - dynamic movement skills, however; be aware of growth spurts, bones grow first and muscles and tendons become inflexible as they get stretched tight until they catch up to the bone
- Agility, balance, coordination and the introduction of skills for speed (ABCs) on or off the wall
- Develop linear, lateral and multi-directional speed on or off the wall

Technical:

- Basic route reading and visualization of sequences
- Develop ability to safely move out of comfort zone
- Develop climbing terminology
- Teach basic climbing skills, such as:
 - Foot placement, body position, hand position i.e. safe gripping positions or to avoid over crimping and one-finger isolation/monos
- Hold orientation and wall angle introduction, in a fun and playful way
- Build knowledge of the basic shapes of holds and equipment and develop their use

Tactical:

- Introduce simple rules and ethics of sport
- Introduce various competition formats and understanding of competition
- Commence understanding of climbing finishes such as on-sight, flash, send

Mental:

- Reinforcement a positive attitude to sport
- Introduce concept of believing, embracing challenge and self confidence
- Introduce concentration skills, such as visualization
- Encourage positive reinforcement from coaches and parents
- Encourage supportive communication with peers
- Introduce the concept of overcoming obstacles and working with your body to solve a physical puzzle, perseverance
- Encourage managing negative outcomes and failures in a positive way
- Encourage relaxation techniques for further enjoyment



Activities Should Include:



Lifestyle:

- Promote involvement in multiple sports
- Promote and teach safety
- Continue to encourage physical activity that is based on enjoyment and fun
- Promote fair play
- Foster a positive attitude towards activity and participation
- Promote teamwork and personal interaction skills

Key Skill Acquisition:

- Rudimentary understanding of climbing footwork:
- Stay near the toes and off the balls of the foot
- Use both inside and outside edges
- Be precise and light upon initial placement of the foot
- Basic understanding of climbing postures and stability:
- Demonstrate scapular control and correct pulling posture
- Demonstrate hip/core stability
- Understand the importance of maintaining stability while climbing, avoid swinging out of control
- Use balance to stabilize 2 and 3-point climbing positions
- Identify the types of hand holds
- Describe the 3 disciplines in sport climbing (boulder, difficulty, speed)
- Move decisively on all types of terrain (slab, vertical and gentle overhangs, steeps and roofs)
- Describe “red-point”, “on-sight” and “flash”, and their application
- Comprehend the purpose of a “warm-up” and “cool-down”
- Demonstrate competence belaying a Top-Rope climber of similar weight and size

Health & Medical Considerations:

Starting in stage 2 through to stage 8, identify a Sports Medicine Physician for support. Observe for the appearance of overuse injuries in general but specifically in the mature athlete in stage 6 and beyond for, tendon rupture, tendonitis, pulley ruptures, muscle tears, arthritis, stress fractures, also commence identifying which movement creates risk of injury, i.e. heel hook — hamstring or the importance of open hand grip.



Stage 3: Learn to Train

Ages:

Male 9-12 years

Female 8-11 years

Objectives of this stage are: Enhance Agility, Balance, Coordination and skills for Speed (ABCs) and to develop overall sports skills. Refine movement and basic sport skills through initial participation in structured, seasonal sport programs. Continue to develop a “climbing vocabulary”. While they are likely to have favourite sports, they should still be taking part in a range of activities and they are not ready for specialization or high intensity training and competition. Activities must be fun and tailored to the child’s stage of development and ability. Adapt to growth spurts; typically for girls ages 7 to 12 and boys ages 10 to 14, however each child is unique and develops at different rate.

Description:

- A prime period for rapid skill acquisition and development (motor learning)
- Developing self-image and capacity for abstract ideas (e.g. sport tactics)
- Enjoys progressive, challenging experiences when accompanied by feelings of success and mastery
- Flexibility becomes increasingly important towards the end of this stage as the individuals approach their period of most rapid growth and development
- Measuring height is a key indicator of a growth spurt and that the onset of puberty is not far behind
- During this stage we need to be especially aware of growth plate vulnerability to stress fractures. Skeletally immature finger joints are susceptible to growth plate fractures, we must be hyper-vigilant for signs of repetitive strain injuries
- Readiness to advance to Train to Train stage is determined by skill proficiency and measured increase in PHV

Important For:

- Adaptation to a seasonal, structured training program
- Further development and consistent demonstration of climbing skills
- Obtaining expert instruction on technique
- Pre-growth spurt, focus is on repetition of skills towards mastery
- Monitored flexibility training, with hip and scapular stability focus
- Development of positive self-attitude, for others and sport



Training Sessions:

- 1-4 climbing sessions per week, 1 - 2.5 hours per session
- High repetition, low intensity activity focus
- 2-3 other sport activities through the year, number of activities should decrease towards the end of this stage
- High repetition, low intensity skill focus with some intensity progression to challenge skill acquisition
- Full grasp of all 3 disciplines of sport climbing and competition formats, integrated into training sessions

Competition:

- Mock competitions and introduction to competitive structures and events
- Competition schedule guideline: Participate in the minimum number of qualifying events to have the opportunity to compete in Provincial, Regional and National events (if applicable)
- Competition schedule should maximize preparation for the highest level of competition for the athletes skill level
- Schedules should maximize length of training cycles and be evenly spaced, with a longer preparatory training cycle at the start of the season
- Learn to Train matches Category D (ages 10 and younger) and Category C (ages 11 - 12); these categories pose the greatest development opportunity from a programming perspective
- Category D progresses to a maximum of provincial level competition; Speed competitions are recreational and introductory only
- D can have further divisions to separate the older/more advanced competitors
- Category C requires much needed skill acquisition due to their transition into Lead climbing at the next stage; Speed competitions are again recreational and only for preparation for the next level

Venues:

- Climbing centres accessible year round
- Seasonal climbing camps
- School sports

Activities Should Include:

Physical:

- On and off the wall continue to develop Agility, Balance, Coordination, the introduction of skills for Speed (ABCs), technique and endurance
- Involve own-body exercises for strength building
- Introduce basic flexibility exercises, focusing on abductors, scapular stability and latissimus dorsi
- Include stability training
- Introduce concepts of warm-up, cool down, stretching, nutrition and mental skills
- Begin to introduce pre-habilitation movements and recovery protocols to reduce injuries and increase performance.

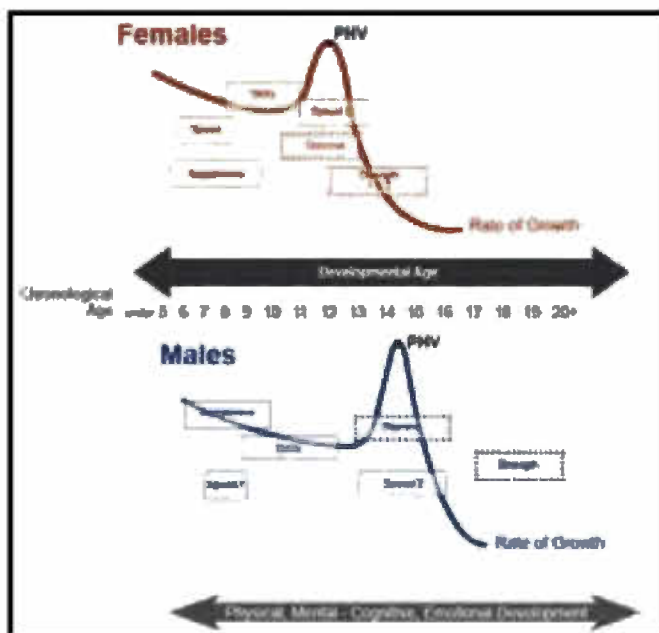
Technical:

- Perform basic skills on progressively harder wall angles and grips
- Strong emphasis on skill development
- Refine climbing skills, primarily hand placement and position, foot work and body position
- Teach basic practice skills, training session and facility use, climbing etiquette, pace, duration on and off
- Teach all advanced movements skills while being spotted/assisted until able to perform on their own.

Tactical:

- Include modified climbing events, measuring on-sight climbing, and use a defined time frame to send/complete problems and routes
- Introduce basic competition principles, for example, warm up strategies, order of climbers in competition in various formats, reviewing results and preparation for the next event or climb that day or through competition
- Introduce competition simulation training

Figure 1
Pacific Sports - Optimal Windows of Trainability
(Balyi and Way 2005)



Activities Should Include:

Mental:

- Promote understanding of the role of practice towards goals, i.e., working a route, breaking it down into manageable parts, to be able to send a project
- Continue to promote the concept of perseverance
- Continue to develop confidence through activities, reading, discussion and practice
- Continue to develop concentration and introduce the concept of mental preparation
- Promote positive reinforcement for effort and achievement

Lifestyle:

- Promote involvement in multiple complimentary sports
- Promote sport as a lifestyle commitment
- Provide knowledge of the changes puberty will bring
- Introduce discipline and structure
- Promote an understanding of the relationship between effort and outcome
- Continue to promote teamwork and personal interaction skills. This can be a challenge because of the individual nature of the sport, but training together and motivating and supporting each other can create team spirit

Key Skill Acquisition:

- Specialized:
 - Foot placements/secondary level footwork; heels, toe-hooks, bicycles, pivots
 - Body positions/climbing posture; rotations, lock-offs, feet-up sequential movement
- Correctly execute use of pivots and torso rotation
- Demonstrate various types of flagging, minimum of 3 types (inside, outside, standard)
- Be able to demonstrate the difference between controlled and dynamic movement
- Use momentum effectively while climbing
- Be able to sequence sections of climbs in advance
 - Understand hold direction and opposition
 - Describe how positioning of footholds affects movement
 - Understand terrain consideration when choosing skills
- Demonstrate smooth sequential movement from the feet up
- Initiate large movements from the lower body
- Use the legs for both pushing and pulling actions
- Climb with fluidity and dynamic balance on easy terrain
- Able to describe at least 3 basic strategies for climbing in competition
- Able to define: "reathy", "powerful", "technical", "pumpy"
- Route reading and sequencing
- Understand how the body adapts to exercise and have been introduced to sport specific training methods (pre-set drills, pull up-board, rock rings).



Health & Medical Considerations:

Starting at this stage, and in some cases earlier, through to stage 8 be aware of over-training, look for signs of chronic fatigue and immuno-suppression, but also develop a focus on nutrition, mental training, self-care and increase knowledge in living/training/working with a predisposing condition. At this stage, and in some cases earlier, through to stage 8, be aware of over-training, looking for signs of chronic fatigue and immuno-suppression. Develop a focus on nutrition, mental training, self-care and increase knowledge in living/training/working with a predisposing condition. Nutrition; hydration, pre-competition, recovery, special diets (gluten-free, vegan). Mental training; recognition of eating disorder (bulimia, anorexia, female athletic triad), biofeedback/mindfulness training, pre-competition/competition/post-competition, managing stress is relevant in all stages but particularly at this stage due to the range of physiological changes. Self-care; exercises for cross-training to prevent injury: i.e. yoga, using a therabar, pilates, weight-training, gymnastics, finger board, learning how to land (bouldering), taping, devices, straps, elbow/knee/wrist. Also awareness of training with pre-disposing conditions, like diabetes and epilepsy.



Stage 4: Train to Train

Ages: Male 12-15 years

Female 11-14 years

Objectives of this stage are: Develop endurance, strength, power and agility. Further develop the athlete's physical climbing vocabulary and fitness. Continue to refine Agility, Balance, Coordination and Speed (ABCs) and develop overall sports skills. Integrate more complex physical, mental, cognitive and emotional components within a well-structured program. Introduce competition format-specific protocols to identify strengths and weaknesses. Continue to enjoy a lifestyle of sport and activity. Aim for 70% practice and 30% competition.

Description:

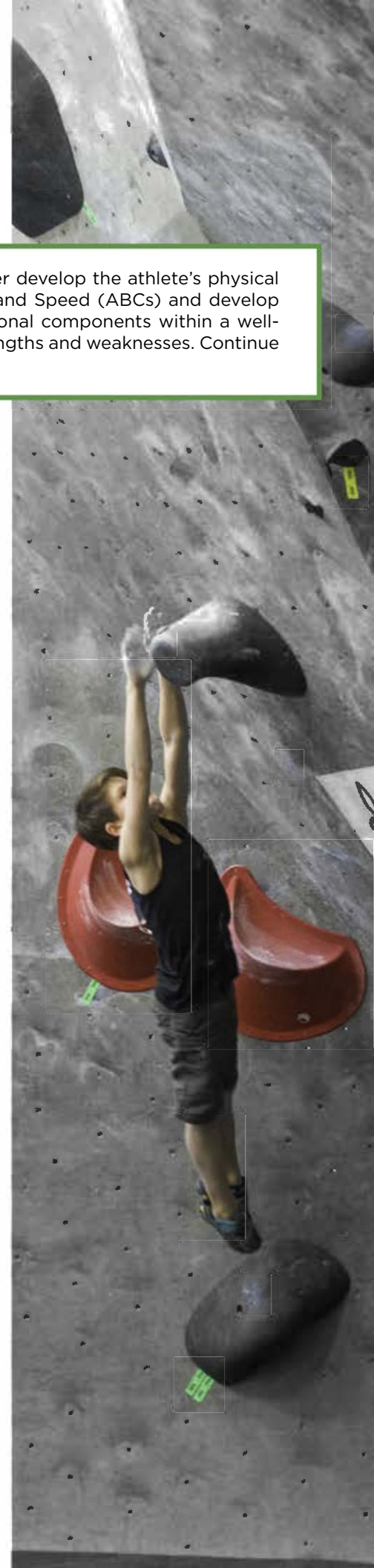
- This stage begins at the adolescent growth spurt:
- Measuring height is a key indicator of a growth spurt and that the onset of puberty is not far behind
- Readiness to enter this Stage is determined by skill proficiency and measured increase in Peak Height Velocity, (PHV) see Figure 1 on page 27
- This is a challenging and critical stage as it encompasses both opportunity and vulnerability in terms of growth and development
- This is the period where individuals tend to change physically at faster rates than when they are younger
- When Peak PHV occurs the bones grow first, sometimes rapidly which puts increased stress on connective tissues
- Flexibility, posture and technique become very important
- At this time of accelerated growth, these elements can be compromised through a reduced range of motion, which can create abnormal movement patterns, supervision and monitoring becomes critical as these changes occur
- During this stage be especially aware of growth plate vulnerability to stress fractures
- Skeletally immature finger joints are susceptible to growth plate fractures, we must be hyper-vigilant for signs of repetitive strain injuries
- Emotionally, the adolescent period brings rapid changes in interests, social connections and peer influence, and potentially increased pressure and anxiety around school, social, and sport expectations and this is a peak period for drop-out from sport

Important For:

- Further development and mastery of climbing skills
- Maintenance and consolidation of skill, speed, and flexibility through the growth spurt.
- Recognizing that temporary declines in skill performance may occur during growth, and expectations must be managed
- Strength development (females immediately after peak PHV, males 12-18 months following peak PHV)
- Learning mental skills required to deal with competition
- Ongoing flexibility training

Training Sessions:

- 1-4 climbing sessions per week, 2-4 hours per session
- High repetition, low intensity activity focus
- Later in the stage intensity increases as well
- 1-2 other sport activities through the year, number of activities should decrease towards the end of this stage
- Introduction of skill based focus along with intensity progression to challenge skill acquisition
- The onset of puberty can lead to awkward social interactions between male and female team mates during training and/or competition, take care to assess any social impact during these times



Competition:

- Competition schedule should progressively prepare for the highest level of competition, through Local, Provincial, Regional and National levels
- Schedules should maximize length of training cycles and be evenly spaced, with a longer preparatory training cycle at the start of the season
- Competitions focusing on the 3 disciplines, Bouldering, Difficulty (described as top rope) with an introduction to Lead climbing at the end of this period), Speed
- Competition schedule guideline: Compete in the minimum number of qualifying events required to participate in National events
- Further develop competition principles — warm up strategies, order of climbers in competition in various formats, reviewing results and preparation for the next event or climb that day or through competition
- This is Category B ages 13-14; this group has the opportunity to be selected for the National Team and represent Canada at international competition
- As of 2015, Bouldering for youth has been included in international level competition but is still under study
- Speed results are recorded at competitions up to the national level to qualify to compete internationally

Venues:

- Climbing centres accessible year round
- Seasonal climbing camps
- School sports, 1-2 other sport activities





Activities Should Include:

Physical:

- Further development of efficiency of movement and increased muscular endurance
- Emphasize general and balanced physical conditioning, include complex dynamic strength exercises, along with strengthening exercises for antagonist muscles
- Prioritize aerobic training after the onset of Peak Height Velocity (PHV) growth spurt
- Develop short speed and endurance climbing through speed wall, tread-wall, auto-belay
- Initiate sport specific weight and body weight training in females after PHV and with the onset of menarche and in males 12-18 months after PHV, introduce various calisthenics
- Focus on hand, shoulder, forearm and core stability, and strength, along with lock off, body tension and compression movement
- Strength and power needs to be developed in the forearm post PHV
- Continue flexibility training, with attention to hip mobility through all degrees of freedom
- Stretches for long bones, along with wrist and finger extensors where motion is required as well

Technical:

- Further develop and consolidate climbing specific skills
- Include an individualized approach to address strengths and weaknesses
- Consider separate training sessions for climbing and strength and conditioning exercises

Tactical:

- Include early stages of specific competition tactical preparation
- Teach and observe different individual competition tactics
- Introduce pacing/rest/recovery skills
- Involve competition simulation training

Mental:

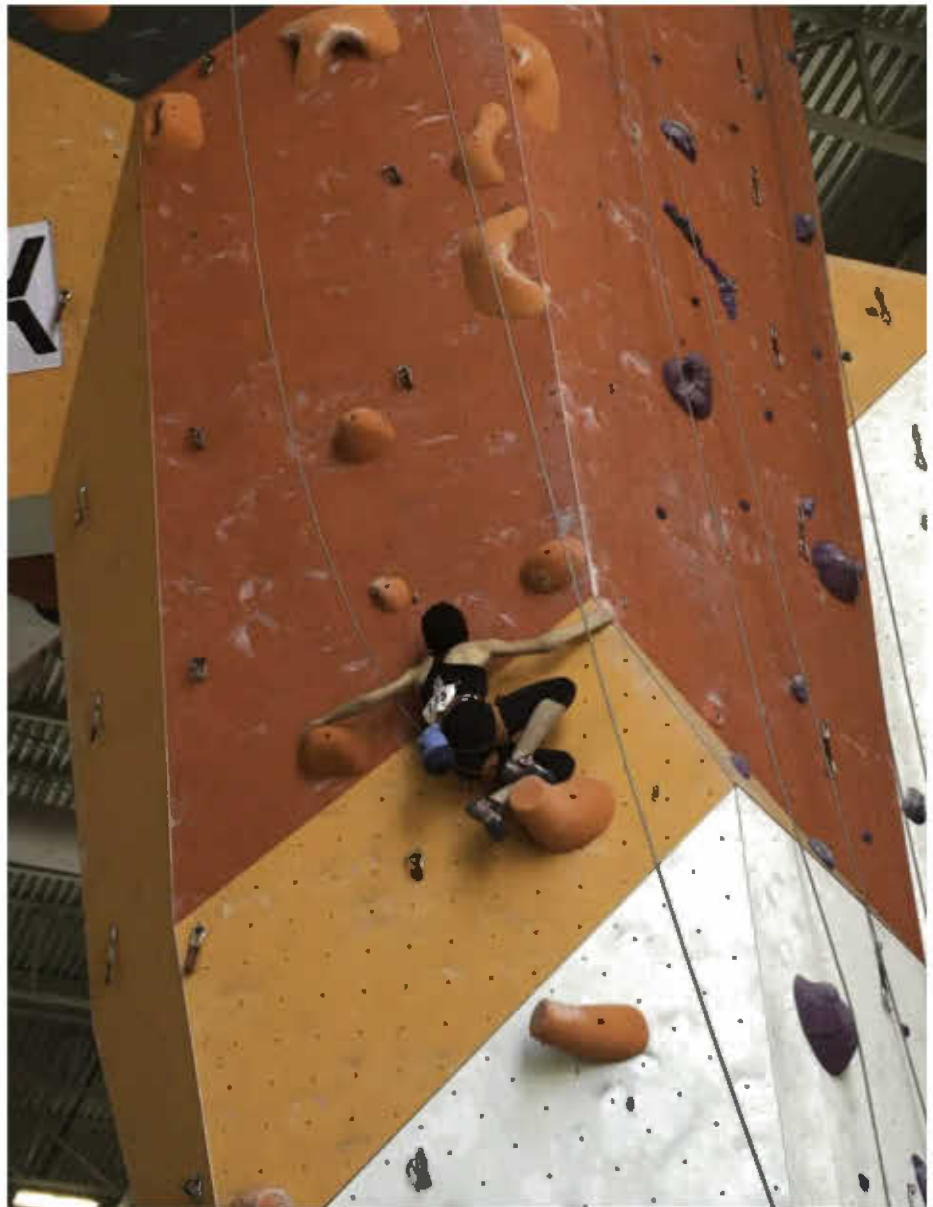
- Introduce goal setting skills (short and medium term)
- Introduce imagery skills (practicing and improving technique and self-confidence)
- Introduce relaxation skills (deep breathing/visualization)
- Teach patience and self-control
- Continue to develop concentration and focus
- Continue to promote positive reinforcement

Lifestyle:

- Teach basic nutrition and hydration needs
- Promote use of training and performance diary/log
- Introduce skills of time management
- Introduce athlete understanding of planning and periodization
- Promote use of rest and recovery techniques
- Continue to promote teamwork and personal interaction skills and promote positive communication
- Promote discipline and personal responsibility
- Introduce and involve experts in the field of nutrition, flexibility, and other areas depending on the short and long-term goals of the group
- Build awareness of Peak Height Velocity and windows of optimal trainability

Key Skill Acquisition:

- Demonstrate all base technical skills from above in a variety of situations (training and competition)
- Use terrain, hold type and discipline considerations to select appropriate technical skills
- Concepts of hang board use to be introduced late in this stage, with attention to low repetition and size
- Demonstrate use of pacing and rest/recovery skills to maximize climbing efficiency
- Able to describe routes/problems in detail:
- Hold directions and types
- Movements and options
- Styles of movement and pacing
- Identification of cruxes and resting positions



Health & Medical Considerations:

Commencing at stage 4 through to the Active for life stage, involve a Sports Medicine Physiotherapist/Athletic Therapist/Chiropractor/Osteopathy/Registered Massage therapist into the training regime, keeping them abreast of any evolving conditions. Parents/coaches/athletes should recognize and seek appropriate treatment for any adolescent athlete with finger pain lasting more than one week. The specific risk here, in athletes around the period of PHV, is finger growth plate fracture.



Stage 5: Train to Compete

Ages: Male 15-18+ years

Female 13/14-18+ years

Objectives of this stage: Optimize format-specific preparation for competition in an annual, periodized training and competition program. Continue with physical, mental, cognitive and emotional development. Increase competitive performance development in progressively higher levels of competition (e.g. national, international), and further build self-confidence.

Description:

- All physical capabilities continue to develop. This is a prime period for development of strength and power
- Self-image and capacity for abstract thought and goal-setting continue to develop
- Athletes are usually ready for more structured mental preparation to help deal with high-level competitions and other life stressors
- External support networks (i.e. beyond the family) become more important
- Readiness to advance to next stage is determined by performance and mastery of competencies

Important For:

- Creating an individualized training approach — based on a post PHV assessment and regular ongoing monitoring
- Developing advanced physical, technical, tactical skills
- Developing the ability to compete at high levels in various environments
- Maintaining flexibility
- Development of autonomy, independence and individual responsibility; ability to cope independently in competition and travel
- Lifestyle skill awareness and development

Training Sessions:

- 3-5 climbing sessions per week, 3-5 hours per session
- Multiple weekly sessions for each aspect of sport performance; technical/tactical, strength/conditioning, flexibility, wellness
- Individualized periodized training with volume and intensity focus
- Other activities that should be incorporated into the training regime are Yoga, gymnastics-style movement and training and cardio fitness
- Skill focus with intensity progression to challenge physical movement that targets problems /routes e.g. finding a physical solution as second nature, on-sight climbing



Competition:

- Competitions focusing on the 3 disciplines, Bouldering, Difficulty (Lead climbing) mastery of skill at the end of this period, Speed
- Competition schedule guideline; number of competitions is similar to those in Stage 4
- Compete in the minimum number of qualifying events to participate in National competitions
- Other events that are deemed “recreational” in nature (i.e. do not follow IFSC format) are valuable as a physical training and motivation tool and further enjoyment of climbing, but should not be exhausting
- Fully developed competition tactics, i.e. warm up, warm down, nutrition before after and during competitions
- This is Category A ages 15-16, and includes JUNIOR ages 17-18; this group has the opportunity to be selected for the National Team and represent Canada at international competition, in both youth and adult divisions
- This group is also permitted to now compete at OPEN competitions due to their age, and this applies to all three disciplines
- Speed results are recorded at competitions up to the national level to qualify internationally



Venues:

- Climbing centres accessible year round
- Formal sanctioned competitions, Local, Provincial, Regional, National and International
- Outdoor climbing experiences
- Seasonal climbing camps participating as a LIT (Leader in Training) and Instructor
- Route setting

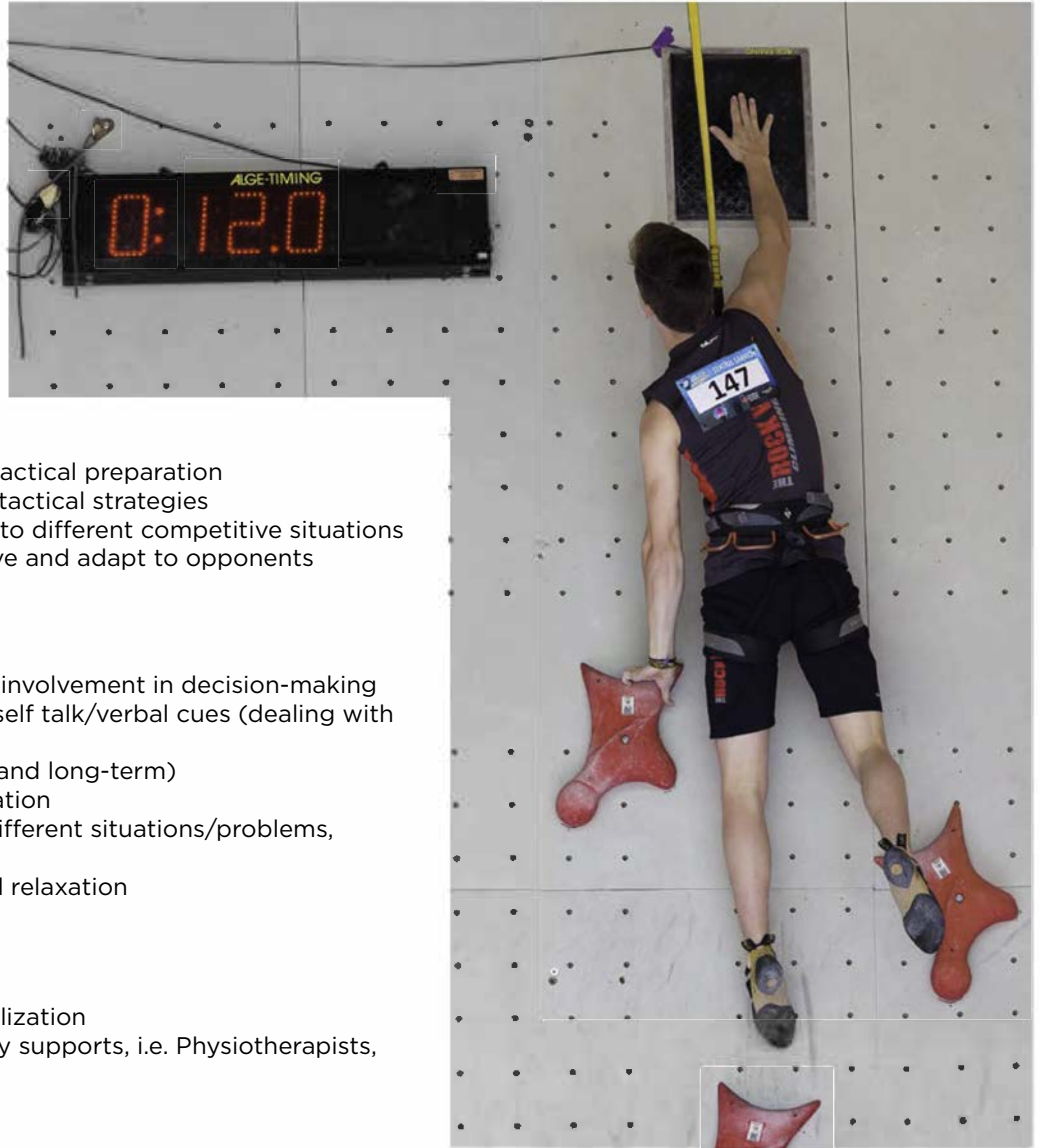
Activities Should Include:

Physical:

- Individualized specific intensive physical conditioning
- A focus on hand, shoulder, forearm and core stability and strength including the wrist and finger extensors
- Continuing flexibility training, key areas are shoulders, and hip; gluteus, post cuff and pectoral muscles
- Focus on optimum preparation: tapering and peaking and nutrition

Technical:

- A high level of proficiency in all climbing skills
- Sport-specific technical and competition skills under competitive conditions and at high intensity
- An individualization of skills: 'personal style'
- Consistency and control under a variety of environments
- Competition simulation training



Tactical:

- Focus on format and event specific tactical preparation
- Principles of aggressive and passive tactical strategies
- Develop an athlete's ability to adapt to different competitive situations
- Develop an athlete's ability to observe and adapt to opponents

Mental:

- Promote personal responsibility and involvement in decision-making
- Refine focus and thought control — self talk/verbal cues (dealing with distractions and negative thoughts)
- Refine goal setting skills (short, mid and long-term)
- Consolidate pre-competition preparation
- Refine imagery skills (competition, different situations/problems, practicing strategies)
- Develop skills for anxiety control and relaxation

Lifestyle:

- Climbing becomes their sport specialization
- Allow for individualization of ancillary supports, i.e. Physiotherapists, Psychologists
- Involve refined self-monitoring
- Plan career/long-term sport options
- Increased knowledge on hydration and nutrition
- Focus on preparation for different environments e.g. heat/cold/rain/altitude
- Refine injury prevention, rest and recovery strategies
- Promote ongoing personal development

Key Skill Acquisition

- The primary focus is to continue the mastery of various climbing movement positions:
- On more complex terrain, volumes, continue to develop 3 dimensional terrain/space; i.e. dihedral
- Complex sequences and movement combinations
- Combination of power and technical movement
- On-sight and flash format visualization and preparation
- Hang-board sequences:
 - Generally avoid single pad hangs with full weight, at all or for periods longer than 10 to 15 seconds, this should be monitored for on going training into adulthood, however regarding deadhangs or hangboard use; we need to be careful about promoting hangs and campusing in adolescent climbers, given the high risk for growth plate injuries. These training modalities should not be used until the climber is skeletally mature (i.e. closed growth plates)
- Do not use additional weight
- Repetition and quantity will vary, and size and volume should be monitored



Health & Medical Considerations:

The same considerations continue from the previous stages apply. Provide a contact list of Medical Personnel for Climbing such as Sports Medicine Physician, Sports Medicine Physiotherapist/Athletic Therapist/Chiropractor/Osteopathy/Registered Massage therapist, Nutritionist, Psychologist/Mindfulness Trainer-Coach, knowledgeable in sport climbing.

As noted in the previous stage, parents/coaches/athletes should recognize and seek appropriate treatment for any adolescent athlete with finger pain lasting more than one week. The specific risk here, in these athletes around the period of peak height velocity, is finger growth plate fracture.



Stage 6: Learning to Win

Ages: Male 18+ years

Female 16+ years

Objectives of this stage are: Maximize competition-specific preparation to obtain peak performance results “on demand” in high-level competition (i.e. International). Introduce a formal performance enhancement team, a knowledgeable expert group who can provide support physical, emotional and mental readiness. Continue with integrated physical, mental cognitive and emotional development.

Description:

- Optimized program towards peak performance at specific moments
- High performance career at this level and beyond



Important For:

- A developed approach built around a longer term competitive schedule and annual training plan
- Advanced physical, technical, tactical skills
- Mastering competing at consistently high levels under various environments
- Assuming leadership role within group settings
- Establishing, regular short breaks within competition and training plans
- Creating a self-directed program with coaching support, and beginning to introduce elite coaching

Training Sessions:

- 4-6 climbing sessions per week, 2-5 hours per session
- Continued individualized training focus with volume and intensity focus
- Other activities that should be incorporated into the training regime are Yoga, Gymnastics style movement/training, Parkour, Martial Arts and cardio fitness
- Increase in intensity and challenging movement that targets route reading as second nature

Competition:

- Advanced competitive schedules
- Competitive modelling of peak performance objectives
- Fully developed and individualized competitive routines such as warm up, warm down and nutrition
- Refinement and implementation of multiple racing tactics relating to speed climbing
- This category is called OPEN – and are primarily Adults or elite youth with minimum age of 16 years. This group has the opportunity to be selected for the National Team to represent Canada at international competition
- This applies to all three disciplines, and Speed results are recorded at competitions up to the national level to qualify for speed team internationally

Venues:

- Climbing centres accessible year round
- Formal sanctioned competitions, Provincial, Regional and National and International competition streams
- Outdoor climbing experiences
- Coaching/mentoring opportunities
- Route setting



Activities Should Include:

Physical:

- Focus on strength and power is required, due to the demand of speed climbing,
- Focus on the maintenance and possible improvement of physical capacities with a view to maximizing performance
- Continuation of hand, shoulder, forearm and core stability and strength, with no restrictions on strength training modalities, as at this stage there is very little risk of finger growth plate fractures
- Focus on a fully individualized approach
- Frequent preventative breaks, for rest and recovery
- Encourage Nutrition and Training an essential component to how athletes perform and recover

Technical:

- Ensure refinement of climbing specific skills
- Include event-/competition-specific training skills that are automatic/second nature
- Develop the ability to improvise with skills

Tactical:

- Develop effective competition strategies
- Adapt strategies to situation
- Model all possible aspects of performance in training
- Specialized training programs for different times in the year/competition

Mental:

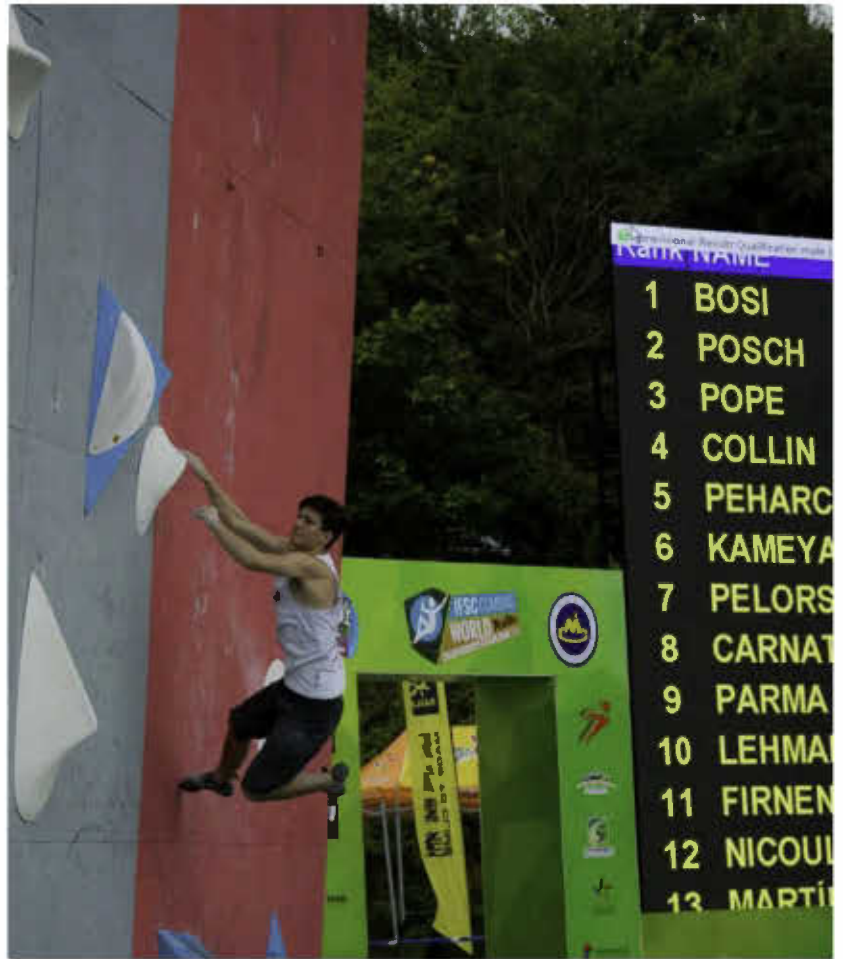
- Promote independent decision-making
- Develop athletes capable of working in a team environment and evaluating advice from outside sources
- Consolidate well developed, refined and individualized mental skills and routines
- Promote refocusing plans/coping strategies
- Promote the will to win and drive for competition
- Consolidate the ability to concentrate and refocus

Lifestyle:

- Climbing becomes their sport specialization
- Allow for individualization of ancillary supports
- Increase knowledge on all areas related to personal well being
- Include rest and relaxation, with frequent breaks
- Require well developed self-monitoring
- Continue to plan career/long-term sport options

Key Skill Acquisition:

- The primary focus is the mastery of various climbing movement positions:
- On more complex terrain, volumes, continue to develop 3 dimensional terrain/space; i.e. dihedral
- Complex sequences and movement combinations
- Combination of power and technical movement
- On-sight and flash format visualization and preparation



Health & Medical Considerations:

During this stage some key areas to focus on are mental training and recognizing eating disorders (bulimia, anorexia, female athletic triad) as well as biofeedback/mindfulness training - pre-competition/competition/post-competition as well as managing stress. Athletes should focus on self-care, as well as cross-training to prevent injury: i.e. yoga, using a therabar, eccentric training, pilates, as well as the proper use of devices, e.g. straps, taping of the elbow/knee/wrist.



Stage 7: Winning for a Living

Ages: **Adult Years**

Objectives at this stage are: Maximize event specific preparation for results at the International level; maximize training competition and recovery activities in support of a professional athletic career; attain competitive consistency and repeatability when it counts.



Description:

- At this Stage that all systems (physical, technical, tactical, mental) are fully maximized and refined to ensure excellence at the highest levels (i.e., World Difficulty circuits, World Cup Bouldering circuits, and Speed)
- Emphasis may switch to climbing outdoors on real rock
- Sponsorship may play a key role in the development of the athlete but it may contribute to layers of stressors involved in training and competition. Considering the high degree of unknowns when competing the athlete should thrive in this environment.

Important For:

- Staying positive, focused and driven through multiple weeks and months of events, as the climbing competition cycle can last year-round.
- Being confident and believing in their ability to compete at this level.
- An attitude that fosters, positivity and open-minded approach is imperative to the athlete's development

Training Sessions:

- While there is definitely an increase in the amount of training at this stage, it is also important to train based on feel, and the ability to make intuitive choices for development
- Develop the aptitude to be flexible in the daily training plan, or make immediate changes to training when needed
- Group training is essential, it can foster friendly competition and build creativity.

Competitions:

- Multi day events; will impact how training occurs between events
- Hand, skin and muscle soreness are mostly impacted
- Frequency of the events will greatly affect performance;
- For example a 2 day events allows for rest on the third day, climb and train again on the fourth and fifth day, possibly the 6th day, rest on the seventh day, and then the cycle would repeat
- During these cycles, peaking for events is challenging, but it is a great opportunity to train with other international level athletes and foster a group mentality
- It is essential to familiarize with the venue.

Venues:

- International venues, that may be temporary or unique
- Climbing centres accessible year round
- Formal sanctioned competitions, National and International competition streams
- Outdoor climbing experiences
- Non-climbing venues such as speaking engagements.

Activities Should Include:

Physical:

- Physical areas of development are the same as the previous stage, however a keen visual acuity level is imperative.

Technical:

- Repetition of world cup style movements
- Visual climbing techniques based on terrain (dihedral, corners, physics and how to stabilize motion, momentum).
- Keen body awareness to execute unique moves.

Tactical:

- Determine where isolation will be pre-competition, how big will be it be, what is the set up will it impact warm up procedures
- Meal planning, how and when eating effects immediate performance
- Format of the event, for example if the event is a flash format, determine who to watch, or discuss the route with, which competitors do to watch, and know exactly what to look for based on climbing style.



Mental:

- Athletes should not be affected by other competitors or have an impact on performance
- Determine routines to enhance competition style, for example use competition-only shoes and develop a well-honed warm up routine
- Ability to activate a mental/cognitive “switch”, for example between a casual conversation, to being 100% present and focused on a training circuit
- Confidence in climbing is fundamentally one of the most important factors in climbing
- This is built differently in different athletes
- Testing confidence can be done using many different methods
- Frequently test or create a game, especially in training
- The drive to win in competition is important, but maintaining drive at each training session is imperative for an elite athlete.

Lifestyle:

- Sponsorship can play a key role in building confidence but can be detrimental when seen as status, this may increase confidence, but it can also add unnecessary pressure
- Continue to have fun at training, although competition stakes are higher, it should not be taken too seriously and potentially lose the enjoyment of climbing
- 24 hour athlete, all life aspects must be considered

Key Skill Acquisition:

- Develop keen hand-eye coordination and body awareness
- Mantles: with and without foot/feet, 45-degree mantle volume press
- Slab traverse and slab step up
- Dynos: Double Clutch, Double Double Clutch, Dyno foot stab, Triple Clutch, Dyno to double shoulder, Blind Double Dyno, Dyno, blocked arrival
- Skate to foot match and to foot catch on undercling
- Pogo
- Feet first moves
- Volumes; Traversing around triangle volume (different sizes) and Traversing round volumes
- Mantle two volumes side by side

Health & Medical Considerations:

If athletes have moved into a national or world level of competition, starting in stage 4 to 7 a Nutritionist, Psychologist/ Mindfulness Trainer-Coach can be consulted, based on the needs of the athlete.



Stage 8: Active for Life

Ages: Any Age



Objectives at the Active for Life stage are: Transition to a second career in sport, or simply maintain an active lifestyle. Give back to the sport as a coach or in other capacities. This can happen at any age.

Description:

- Active for Life is a stage for mature participants (post-puberty, through adulthood)
- In this stage athletes have generally withdrawn from competitive sport with a high performance focus.
- Second sport career - Sport as a lifetime activity
- Opportunity to pursue complimentary sport activity
- Transition to second career sport or active lifestyle plan.

Important For:

- Pursuing the many opportunities to stay in sport and their expertise and knowledge, as a former athlete, can be used in many fields such as coaching, mentoring, administration or officiating
- Consideration of complimentary activities to continue competitive activity
- Implementation of active lifestyle plan for de-training process
- Self-directed programming
- Lifestyle - post competitive training.

Training Sessions:

- Determined by chosen activity and schedule
- Specialization to second sport career focus or non-specialized active living
- Individualized training focus.

Competition:

- Dependant on chosen path — recreational competitive opportunities suggested.

Venues:

- Indoor recreational climbing
- Outdoor climbing experiences
- Sport clubs for second career choice
- Recreational competitive sport clubs - Masters, Triathlon
- Health Clubs, etc...
- Outdoor activity
- Transition to a second sport career may involve reintroduction to a previous stage, with new sport-specific requirements

Activities Should Include:

Physical:

- Continued active lifestyle through sport participation
- Endurance training
- Strength training
- Flexibility training

Technical:

- Retain learned skills and develop new ones

Tactical:

- Recreational or masters oriented perspective to competition
- Continue to develop skills to solve problems and overcome challenges

Mental:

- Relaxation
- Readjustment to new active living environment
- Build confidence and determination

Lifestyle:

- Pursue personal and family goals more strongly
- Pursue further education/career development
- Possible engagement in administration, coaching
- Seek transition support, if required

Key Skill Acquisition:

- The primary focus is to continue the enjoyment of climbing in a variety of environments and situations:
- On various terrain indoor climbing and outdoor
- Continuation of the development of complex sequences and movement combinations
- Continue combination of power and technical movement
- Climb for the enjoyment or on-sight and flash format visualization and preparation when projecting



Health & Medical Considerations:

During all stages, proper and effective landing in bouldering and falling in lead climbing are a key for longevity and continued activity. Improper technique may cause medical concerns, such as concussions and musculoskeletal trauma.



Key areas for LTAD Implementation

Growing within the LTAD framework

The main objective of LTAD implementation is to improve the quality of Sport Climbing programs. Over time, offering better quality programs for youth will improve retention of young athletes, enable a greater number of Canadian athletes to reach high performance at the international level, and sustain participation in the Active for Life stage. Five key steps in making this happen are:

1. A unified competition structure.
2. Grass Roots Organizations (GRO) integrating LTAD into their programming.
3. National Coaching Certification Program (NCCP)
4. Supporting the emotional growth and maturity of the climber.
5. Unified skill standards for competition levels.

Unified competition structure, locally, provincially, regionally, nationally - This could have the greatest impact on the development of Sport Climbing in Canada. It requires a shift in thinking toward competitions based on mastery of skills, rather than loosely structured competitions based on social considerations. By testing skills at each group level using a systematic approach, and focusing on quality over quantity in competition scheduling, participants will have a clearer understanding of the results required excel in climbing. This would require all Provincial Sporting Organizations to use harmonized rules and policies for competition formats, levels, and the number and types of competitions required to qualify for higher level competitions.

GRO - like climbing facilities, grass roots climbing organizations will benefit from integrating LTAD-based philosophy and programs. Climbing is a fairly new organized sport in Canada and this is a great opportunity to raise the fitness and skill levels of all athletes at the local level. Climbing facilities can use the structure of the LTAD to develop quality programs that will be consistent throughout the country. To facilitate this document will be made available to facility operators, coaches, athletes and parents.

NCCP - Qualified coaches are key ingredients in any good sport program. Quality coaches offer quality programs, and build communication pathways with athletes, facility managers, and route setters, to better support their athletes in training and competition. The Sport Climbing LTAD framework and associated learner outcomes provide an essential guide to coaches, and are also foundational to development of a Sport Climbing National Coaching Certification Program (NCCP). This NCCP development is in progress, incorporating examples from other existing NCCP programs and integrating our Association of Canadian Mountain Guides (ACMG) and Fédération Québécoise de la Montagne et de l'Escalade (FQME). It is expected that in time, facilities will require NCCP certification of all coaches and instructors.

Supporting emotional growth and maturity - Climbing is a mentally challenging sport. Many issues influence a climber's success and enjoyment: perceived confidence, pre-existing medical conditions, perceived ability, physical fitness or simply fear of failure. The fear of failure plays a big role because in an individual sport like climbing a participant's success and failures are his or her responsibility alone. Well-trained coaches, following a systematic LTAD approach, will be better equipped to provide stage-appropriate support and help climbers overcome fear, work through failure to build confidence, and implement techniques to build physical and psychological strength on and off the wall. Climbing is about solving problems that increase in difficulty as you move along the route; having the tools to find solutions is a key to success and lifelong enjoyment of the sport.

Unified skill standards for competition levels - Currently, it is the responsibility of the coach and facility manager to ensure that competitors are placed in the appropriate competition level. With development of the LTAD framework, and further work to build a LTAD-based Athlete Development Model (ADM), it will be possible to create a set of national standards for competition format, level and athlete qualification for local, provincial, regional and national competitions and championships.

Future documents and actions recommended

- 1) National Sport Organization (NSO) review of the National Competition structure that supports the LTAD model – to plan the competition schedule within a National framework that encompasses Provincial/Local Competitions, keeping focused on the critical shortfalls noted in the summary provided above from Athletics Canada.
- 2) Development of specific, measurable physical, technical (skill), tactical (competition) and mental-emotional requirements for each stage of the LTAD - a description of progressions that a participant needs to master stage-by-stage in the sport. This is referred to as an Athlete/ Participant Development Model (ADM/PDM) - integrated and aligned with LTAD.
- 3) A National Coaching Certification Program (NCCP) integrated within the current expectations of Coaching Canada and aligned with long-term athlete development, with associated Coaching Development Model (CDM).
- 4) Inclusion of programming for participants with disabilities, and a framework to develop Para-climbing within Canada.

Climbing Escalade Canada, Our Governing Body

- 1) National Sport Organization (NSO) review of the National Competition structure that supports the LTAD model – to plan the competition schedule within a National framework that encompasses Provincial/Local Competitions, keeping focused on the critical shortfalls noted in the summary provided above from Athletics Canada.
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- 3) A National CoaClimbing Escalade Canada, the CEC, is the governing body for competition Sport Climbing in Canada. CEC has in the past 4 years undertaken a very important restructuring of governance and the competition structure in Canada. CEC is now composed of four Provincial Sport Organization members (PSO) plus the Alpine Club of Canada (ACC) acting as a Regional Sport Organization (RSO) and regrouping climbers from other provinces and recreational climbers across Canada. New PSOs, for the remaining provinces, may join in the near future as Sport Climbing is growing very rapidly in the country.

CEC comprises of Open (Adult) and Youth Divisions. CEC is the only sanctioning body for competition climbing in Canada, a member of the International Federation of Sport Climbing (IFSC) and recognized by the Canadian Olympic Committee (COC). Athletes representing Canada at IFSC sanctioned competitions are selected based on ranking and must hold a membership in good standing with the CEC for Competitive Youth or Open categories.

CEC encourages and sanctions national level competitions across Canada and co-organizes International level competitions sanctioned by the IFSC such as World Cups, Pan American Championships or World Championships. CEC provides competition information and application packages to individuals or organizations that would like to hold a sanctioned competition. It reviews these applications and provides “sanctioning” and support for National Series events or National Championships. CEC ensures that these sanctioned events are run safely, fairly, equitably, consistently and according to CEC Rules and Regulations.

Climbing Escalade Canada envisions a future where Sport Climbing is a multi-discipline sport providing the opportunity for participation, and promoting fitness, well-being and social values at all levels of interest and ability, regardless of age, from recreation to high performance.

ching Certification Program (NCCP) integrated within the current expectations of Coaching Canada and aligned with long-term athlete development, with associated Coaching Development Model (CDM).

- 4) Inclusion of programming for participants with disabilities, and a framework to develop Para-climbing within Canada.

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Development of the Athlete Development document has been an exceptional journey for the climbing community. Climb for Life was initiated in 2015 to propel this project forward and has created many opportunities of collaboration amongst well respected coaches, medical professionals, athletes and administrators. Climb for Life is a Southern Ontario community based project working in conjunction with Sport for Life Society leaders to build on the Sport Climbing LTAD and coaching knowledge of the LTAD. Health Specialists with in-depth climbing knowledge were invited to contribute scientific content and 16 coaches were involved with developing content and interacting with our Health Specialists during the interactive portion of the project. With the success of Climb for Life in Ontario we hosted another session in Banff Alberta with a greater cross section of coaches from British Columbia to Newfoundland.

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Glossary

ABCs: Agility, Balance, Coordination, Speed (movement literacies).

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

Adolescence: is a difficult period to define in terms of the time of its onset and termination. During this period, most bodily systems become adult both structurally and functionally. Structurally, adolescence begins with an acceleration in the rate of growth in stature, which marks the onset of the adolescent growth spurt. The rate of stature growth reaches a peak, begins a slower or decelerative phase, and finally terminates with the attainment of adult stature. Functionally, adolescence is usually viewed in terms of sexual maturation, which begins with changes in the neuroendocrine system prior to overt physical changes and terminates with the attainment of mature reproductive function

Aerobic Endurance: Ability to exercise for long durations using aerobic energy systems.

Aiming/Hitting: Hitting a target with an object.

Agility: The ability to move quickly in three dimensions while remaining in control of the movement.

Balance: Ability to remain upright while moving. Includes static balance and balancing while moving or gliding.

Bicycle: A foot movement involving both feet squeezing either side of a hold or holds. One foot pushing down the other foot pulling up to create compression. Often used in very steep climbing such as horizontal roof type moves.

Childhood: ordinarily spans the end of infancy — the first birthday — to the start of adolescence and is characterized by relatively steady progress in growth and maturation and rapid progress in neuro- muscular or motor development. It is often divided into early childhood, which includes pre-school children aged 1 to 5 years, and late childhood, which includes elementary school-age children, aged 6 through to the onset of adolescence.

Chronological age: refers to “the number of years and days elapsed since birth.” Growth, development, and maturation operate in a time framework; that is, the child’s chronological age. Children of the same chronological age can differ by several years in their level of biological maturation. The integrated nature of growth and maturation is achieved by the interaction of genes, hormones, nutrients, and the physical and psychosocial environments in which the individual lives. This complex interaction regulates the child’s growth, neuromuscular maturation, sexual maturation, and general physical metamorphosis during the first two decades of life.

Coordination: Moving several parts of the body serially or simultaneously to achieve movement.

Core Strength and Stability: Strength of the core muscles of the trunk, including chest, back and abdomen, which provide an “anchor” for the effective use of arm and leg muscles.

Dihedral: A wall shape defined by an “open book” like feature with a distinct inside corner. Where 2 sections of wall meet and form an angle less than 180 degrees.

Dyno: Explosive movement using momentum, where the 2-4 points (2 hands, 2 feet) would move off the holds simultaneously.

Fine Motor Skills: Movements controlled by small muscles, e.g. hand or finger movements.

Flagging: Inside and outside; A balance move usually done with an extended leg and foot. The inside or outside of the foot presses against the surface of the wall when there is no hold available in the required location. Can also be done with arm/hand, though less frequently.

Flash: Completing a route or bouldering problem on the very first attempt without falling, restarting or resting on any holds not considered part of that route or problem. In a “Flash”, the climber can gather information about the climb, from any source, and in some cases even receive instruction during their climb. Flash as a format in competition restricts some of these variables.

Foot match: Using the same hold with both feet at the same time. Normally used as a type of foot “switch” where the climber needs to maintain balance or correct/change their sequence.

Hangboard: A piece of training equipment used for training suspensions and pulling exercises. Usually made out of PolyUrethane (sometimes wood is used to provide a more comfortable surface for the skin) the same as climbing holds, these boards are normally 18”-24” wide and anywhere from 8” - 18” tall. While some boards might contain a variety of edges, pockets, pinches and jugs, other boards might specialize in a certain type of grip. Normally mounted vertically above head height with open space beneath to allow for the free movement of the body.

Heel-hook and toe hook: Using the heel or toe (top of shoe above the toes) to maintain stability, create directional movement or take pressure off the hands.

Mantel: Technique used to move the body into a “support” position (shoulders above the hands, arms straight, legs extended below), generally finishing once the arms get straight and the climber is able to then place their foot on the same surface as the hands.

Mono: Referring to the use of a single finger for climbing. In outdoor situations this would be a small pocket that would fit only 1 finger, and indoors the grip is designed the same way, a pocket with only room for 1 finger.

Motor learning: Refers to learning a new physical skill by trying and practicing the skill. Participants involved in motor learning most likely had instruction, visual cues or any number of learning strategies in place before attempting the skill. The 3 stages of Motor Learning are Cognitive (overall understanding), Associative (refining the movements) and Autonomous (able to apply the skill to a variety of situations with minimal thought process).

On-sight: Unlike “Flash”, in an On-sight the climber is attempting to climb a route or boulder problem on their first attempt with no previous information about the route from any source other than what they are able to see from the ground. Gathering information from other sources is not allowed.

Periodization: A training program broken down into phases (periods) to promote progressive development.

PHV or Peak Height Velocity: the maximum rate of growth in stature during growth spurt. The age of maximum velocity of growth is called the age at PHV.

Physical Literacy: The competence of an athlete in a wide range of physical activities, and the confidence and motivation to remain active for life which comes with that competence; a foundation for all sport development.

Pivot: Characterized by the turning of the hips and shoulders at the same time as a change of direction of the feet. This movement often occurs without changing the holds being used by the hands and feet.

Pogo: A dynamic kicking and jumping leg/foot motion used to create momentum and inward rotation towards the climbing wall.

Pumpy: Describing a style of climb that has a sustained difficulty with little to no recovery options such as a resting position or holds that allow the climber to rest one arm at a time.

Red-point: Successful start to finish completion of a route or boulder problem that is after the first attempt, and involves no artificial aid such as resting on a rope or starting from anywhere other than the agreed to start of the climb.

Reachy: A route or bouldering problem that has movements requiring or made significantly easier by a taller climber.

Send: Successful completion of a route or boulder problem on any attempt that involves no artificial aid such as resting on a rope or starting from anywhere other than the agreed to start of the climb.

Sensitive (or Enhanced) periods of development: refers to a point in the development of a specific ability when training has an optimal effect on development. The same experience, introduced at an earlier or later time, has less effect on later skill acquisition.

Slab: A section of wall whose angle is less than vertical where the wall slants away from the climber.

Speed 1: Speed increases due to improvements in neuromuscular coordination. Generally, this is a development of low-load or unloaded speed of limb movement.

Speed 2: Speed increases due to improvements in energy systems, anaerobic alactic and lactic. Generally, this is a development of loaded or strength-dependent speed.

Strength 1: Strength increases due primarily to increases in neuromuscular coordination, not muscle fiber growth. This can occur before or after puberty.

Strength 2: Strength increases due primarily to increases in lean muscle mass- hypertrophy. This occurs post-puberty.

Strength-endurance: Muscular strength and endurance, allowing repeated static or dynamic muscular contractions with reduced levels of fatigue.

Traverse: Moving sideways across a section of wall.

Undercling: A grip and hold type where the climber's palm(s) will point up (the backs of the hands will point down).

Volume: A hold, often large, installed on the climbing wall to create a new feature or shape. Volumes are often used in conjunction with other smaller holds that are screwed or bolted on to the volume to create a wide variety of movements and obstacles.

Visual Acuity: Ability to discriminate edges and see objects at various distances.

Glossary adapted from Sport for Life