



The Ten Key Factors Influencing LTPD

Research has identified 10 important factors that influence participant development. Orienteering programs built around these factors will ensure that participants can experience optimal development in their chosen sport as well as lifelong involvement in physical activity.

1. Continuous Improvement (kaizen)

The concept of continuous improvement is drawn from the respected Japanese industrial philosophy known as kaizen.

This concept extends to all aspects of the South African Orienteering Federation and its partner organisations (provincial affiliates and clubs) in our efforts to continually improve and evolve into a vibrant and progressive sports community. Given that we are embarking on a major effort to grow participation and develop the sport of orienteering in South Africa, means that there will be a regular need to review our progress and update our strategy. In addition to these internal updates, periodic updates of the SAOF's LTPD guide will be undertaken at regular intervals in the future based on recommendations from leaders in the South African and international sport community.

LTPD is a dynamic framework that utilises continuous adjustments based on key principles. Continuous improvement ensures that:

- LTPD responds and reacts to new scientific and sport-specific innovations and observations and is subject to continuous research in all its aspects.
- LTPD, as a continuously evolving vehicle for change, reflects all emerging facets of physical education, sport and recreation to ensure systematic and logical delivery of programs to all ages.
- LTPD promotes on-going education and sensitisation of all partners about the interlocking relationship between physical education, school sport, community recreation, life-long physical activity and high performance sport.
- LTPD promotes integration between sport, physical education, recreation, health and education.

2. The FUNdamentals - Developing Physical Literacy

Fundamental movement skills (running, throwing, catching, hopping, bounding, etc.) and fundamental sport skills equals Physical Literacy and reading the environment. The literature on participant growth and development (these terms were identified earlier in a different context!) indicates that children should master the fundamental movement skills and fundamental sport skills before learning more complicated sport-specific skills and strategies. These fundamental skills should be acquired prior to the onset of the growth spurt which occurs in adolescence.

The physical and movement qualities which are developed as physical literacy are essential for participation and enjoyment of sports. Athletics, gymnastics and swimming are three sports which are particularly useful for developing fundamental movement skills and sport skills.

Athletics: Develops many of the fundamental movement skills which are components of all other sports, including running, jumping, throwing and for wheelchair participants, wheeling.



Gymnastics: Encourages the development of agility, balance, coordination, and speed, along with the fundamental movement patterns of landing, statics, locomotion, rotation, swings, springs and object manipulation.

Swimming: is the foundation for all water sports. It is also important for water safety reasons, and teaches balance in a buoyant environment as well as coordination.

3. Chronological Age vs. Developmental Age

A cornerstone of LTPD is the recognition that chronological age differs from developmental age. *Chronological age* refers to the number of years and days elapsed since birth. *Developmental age* refers to the degree of physical, mental, cognitive and emotional maturity along a continuum that begins at birth and culminates in full physical maturity.

Developmental age is highly individual and is a blend of a child or adolescent's physical development (assessed by skeletal maturity or bone age), together with their mental, cognitive and emotional maturity. Participants of the same chronological age between 10 and 16 can differ by as much as four or five years in their developmental age. The beginning of the growth spurt and the peak of the growth spurt are very significant considerations in the application of LTPD to training and competition program design.

A participant's developmental age determines when various aspects of sport and physical activity should be introduced or emphasised. The LTPD model uses the categories "early", "average" (on-time), or "late" maturers to identify a participant's developmental age. These designations help coaches and instructors to

Peak Height Velocity (PHV) is commonly referred to as the adolescent *Growth Spurt*. It is a key indicator of Developmental Age, and is used to identify sensitive periods of accelerated adaptation to training.

design instructional, training and competition programs that are appropriate for the participant's level of development. Identifying a participant's stage of maturation is not difficult. For the most part the indicators of the general developmental process that can be used to observe and monitor growth are relatively easy to gather. For specific information on "how to", see the "Monitoring Growth in LTAD" document (www.canadiansportforlife.ca)

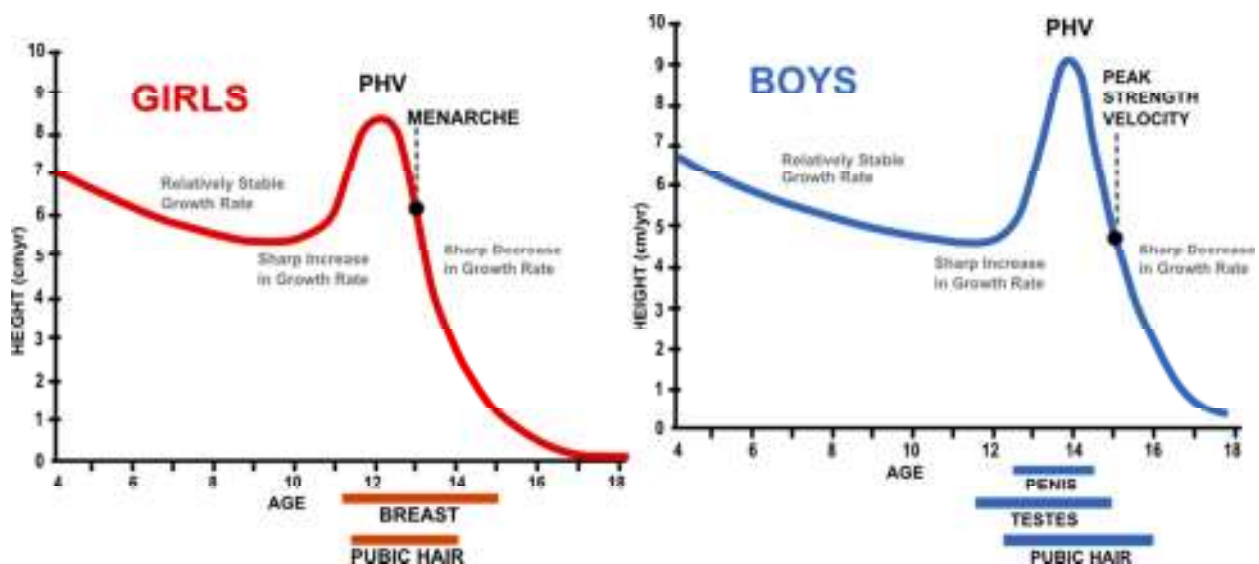


Figure 1: Rate of Change in Height & Peak Height Velocity (PHV), Left – Girls, Right – Boys; highlighting key physical development indicators (adapted from CS4L (2005))



As individuals mature, there are several time sensitive periods when there is accelerated adaptation to training. The LTPD model identifies these periods and makes maximum use of them to introduce skill and fitness development. Figure 1 shows the rate of change in height in boys (left-hand) and girls (right-hand) through the key growth period.

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

PHV in boys is more intense than in girls and on average occurs about 2 years later. Growth of the testes, pubic hair, and penis are related to the maturation process. Peak Strength Velocity (PSV) comes a year or so after PHV. Thus, there is pronounced late gain in strength characteristics of the male participant. As with girls, the developmental sequence for male participants may occur 2 or more years earlier or later than average. Early maturing boys may have as much as a 4-year physiological advantage over their late-maturing peers. Eventually, the late maturers will catch up when they experience their growth spurt.

4. Mental, Cognitive and Emotional Development

Instructors and coaches should recognise that individuals mature at different rates and that the timetable for physical, mental, motor and emotional development varies from participant to participant. Instructors and coaches are encouraged to take a holistic approach to teaching and training participants. This means taking into account a wide variety of psycho-social and emotional factors that influence the participant day-to-day - see Appendix 2.

Cognitive, mental and emotional (affective) elements have a significant effect on participants' performance, and must be prioritised in long-term participant development. Beyond these elements, instructors and coaches should also consider equipment and environmental factors that impact participation, performance and safety. Ethics, including fair play, respect of self and others, and perseverance should be developed within all stages of long term participant development.

5. Specialisation

Typically, sports can be classified along a continuum from early to late specialisation types. Early specialisation sports include artistic and acrobatic sports such as gymnastics, diving and figure skating. These differ from late specialisation sports in that very complex skills are learned before maturation since it is more difficult for them to be taught afterwards. In addition, this differentiation is relevant to the eventual point at which the highest level of performance or competitive excellence is attained or consistently achieved. Orienteering clearly falls into the late specialisation category. However it is important to note that involvement during the early stages of childhood and participant development (i.e. the Active Start and FUNdamentals stages) is extremely important. In particular, foundation orienteering requirements should be introduced during the FUNdamentals stage and firmly established and refined before the end of the Learning to Train stage via appropriately designed activities, events and programs.

Many of the world's most successful athletes participated as children in a wide variety of sports and physical activities. The movement and sport skills they developed as a result have helped them to attain a high level of athletic achievement.



There is much to be gained from a child's early participation in a variety of sports. Early exposure to a wide variety of sport and physical activities will develop some of the physical and movement attributes that are crucial to later success in participation including: agility, balance, conditioning, speed, core body strength, stamina, suppleness, and eye-hand-foot coordination.

Early specialisation in a late specialisation sport can contribute to:

- Overemphasis on sport specific preparation/ one-sided preparation
- Lack of development of basic movement and sport skills
- Overuse injuries
- Early burnout
- Premature retirement from training and competition.

6. Trainability

Trainability can be considered in terms of the 5 S's, namely Stamina, Strength, Speed, Skill and Suppleness.

These are well documented in the literature (Borms, 1985; Viru et al, 1998 and 1999; Rushall, 2000). Biological markers (Balyi, 2002), such as the on-set of PHV (adolescent growth spurt), PHV and the on-set of menarche can identify the "sensitive periods of accelerated adaptation to training" for Stamina, Strength and Skills. The trainability of Speed and Suppleness is based on chronological age, because all research is based on chronological age. Thus, the biological markers will identify the "windows of optimal trainability for accelerated `adaptation to training. (See further details on trainability in the 10S's of training and performance section).

- **Stamina (Endurance)**

The window of optimal trainability occurs at the onset of the growth spurt. Aerobic capacity training is recommended before children reach PHV. Aerobic power should be introduced progressively after the growth rate decelerates.

- **Strength**

The window for trainability for girls is immediately after PHV or at the onset of the menarche (first menstruation) while for boys it is 12 to 18 months after PHV.

- **Speed**

For boys, the first speed training window occurs between seven and nine years of age and the second window occurs between 13 and 16 years of age. For girls, the first speed training window occurs between six and eight years of age and the second window occurs between 11 and 13 years of age.

- **Skill**

In orienteering there are two types of skill to consider, namely physical skill and mental skill. The window for optimal physical skill training (e.g. running in technical terrain) begins at nine years of age for boys and eight years of age for girls. This window narrows down after the onset of the growth spurt.

The window of optimal mental skill training (e.g. critical thinking and abstract thought) for boys occurs between the ages of 12 and 19, and for girls it is open between the ages of 11 and 17.



- **Suppleness (Flexibility)**

The window of optimal trainability for suppleness in both boys and girls occurs between six and 10 years of age. Special attention should be paid to flexibility during PHV.

7. Periodisation (Annual training, competition & recovery plan)

Periodisation provides the framework for organising training, competition and recovery into a logical and scientifically based schedule to achieve optimum performance at the required time. A periodised annual plan, in which training and competition components are sequenced into months, weeks, days and sessions, should be developed for all stages of LTPD taking into account growth, maturation and trainability.

Simply put, designing a periodised yearly plan is time management. This involves planning the right activities with the correct level of difficulty, in the correct sequence to reach the desired training and competition objectives. The plan should be situation specific depending upon priorities and the time available to bring about the required training and competition improvement.

Longer term planning involving the training and competition calendar over a number of years is required in order to truly formulate a logical and sequenced approach to achieve the desired performance objectives.

The plan can be broken down into workable units. The proper sequencing of these units is critical for success. To reach optimum performance in a competitive environment, the training units should be sequenced in the following manner:

- Develop the performance capacity of the participant including physical literacy and sport specific skills, tactics/strategies, physical components, mental skills;
- Integrate the performance factors in a complex and harmonious blend;
- Prepare the participant to perform at important competitions.

In order to design an annual plan, the coach needs to know:

- How the sport specific athletic form is developed;
- The requirements (demands) of the sport during competition;
- The demands of the sport during the preparation phase;
- The competition calendar and the relative importance or purpose of each competition;
- The actual training state of the participant at the start of the yearly plan;
- The contextual reality that the coach and participant have to cope with;
- The principles of long term participant development.

Creating a blueprint for success involves accurate and effective planning of training, competition and recovery.



8. The Ten Year Rule

Scientific research in sport has concluded that a minimum of ten years, or 10,000 hours of deliberate training is needed for a talented participant to reach elite levels. There are no shortcuts; participant development is a long-term process. Short-term performance goals must never be allowed to undermine long-term participant development (Viru, 1995)

In the case of orienteering, there is evidence that to become an experienced World Orienteering Championship performer it takes an athlete approximately 12 years (British Orienteering website, 2010).

The philosophy behind Long Term Participant Development is that it takes 8-12 years of training and practice for an athlete to reach elite levels (Bloom, 1985; Ericsson et al., 1993; Ericsson and Charness 1994, Gibbons, 2002), and that success comes from training, practicing and competing well over the long term rather than focusing on winning in the short term. There is no short cut to success in athlete preparation! A number of recent books have sought to popularise this idea (Gladwell 2008, Coyle 2009, Syed 2010)

9. Calendar Planning for Competition

The domestic competitive and event calendar must support and be aligned with LTPD stages. Different stages of development and different levels of participation have different requirements for the type, frequency and level of competition. During the first 4 stages of LTPD (i.e. all stages up to Training to Train), training and development take precedence over competitions and short-term success. During the later stages participants need to experience a variety of competitive situations and perform well at international and other high level events.

National and international competition and event calendars must be coordinated, and competitions selected according to the priorities of the specific stage of development of the participants (see Appendix 3).

10. System Alignment and Integration

South Africa's LTPD concept is a framework for full sport system alignment in South Africa, integrating health and education with sport and physical activity. It is also a tool for motivating change towards more effective organisation, alignment and integration within each national sport organisation, such as Orienteering.

LTPD recognises that physical education, school sports, recreational activities and competitive sport are interdependent. Enjoying a lifetime of physical activity and achieving athletic excellence are both built on a foundation of physical literacy and fitness.

Stakeholders in LTPD include participants, instructors, coaches, parents, administrators, spectators, sponsors and supporting national, provincial and multi-sport organisations. With so many partners included, system integration and alignment is a major challenge.

It is important that all members of the South African orienteering community work together to implement the right programs and ensure a sport system that will produce optimal conditions for participation, skill development, training and competition. The SAOF has been happy to embrace the LTPD concept and has supported some recent program developments that apply these principles, e.g. the Young Orienteers Challenge (YOC).



This is an important start, but only a beginning. The LTPD concept is an important influence in the South African Orienteering Federation's current Strategic Plan, and ultimately it will provide guidance to all areas of the SAOF's operations.

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