

# Training of Trainability

By Tim LaVallee



This is a look at the sensitivity windows for the development of athleticism, optimal learning, and trainability for long-term athletic development.

A specific and well-planned practice, training, competition and recovery regime will ensure optimum development throughout an athlete's career. Ultimately, sustained success comes from training and performing well over the long-term rather than winning in the short-term. There is no short-cut to success in athletic preparation. Overemphasizing competition in the early phases of training will always cause shortcomings in athletic abilities later in an athlete's career.

Superimposing a scaled down version of adult athlete training and competition is not a good alternative. Ideally, coaches should know the biological ages of their athletes and use this information as the foundation for athlete development models.

One practical solution is to use the onset of Peak Height Velocity (PHV) as a reference point for the design of optimal individual programs in relation to the "critical" or "sensitive" periods of trainability during the maturation process.

Peak height velocity (PHV) is simply the period of time during which an athlete experiences their fastest upward growth in their stature – i.e. the time when they grow the fastest during their adolescent growth spurt.

It should be pointed out that all energy systems are always trainable, but during the so-called "critical" periods accelerated adaptation will take place if the proper volume, intensity and frequency of exercises are implemented.

When it's all said and done however, all "sensitivity phases are always trainable and should be part of an athlete's comprehensive training program.

Trainability has been defined as the responsiveness of developing athletes to a training stimulus at different stages of growth and development.

The critical period or “sensitivity phases” of development refers to the point in the development of a specific athletic trait ie. when training will have an optimal training effect.

Other factors such as readiness and critical periods of trainability during growth and development of athlete’s are factors. The stimulus must be timed to achieve optimum adaptation with regard to motor skills, muscular strength, and/or aerobic endurance, power, etc.

The ability to learn motor skills, react to acoustic and optical stimuli, spatial orientation, sense of rhythm, balance, agility, coordination, ability to differentiate movements (in time/space), endurance, anaerobic capacity, strength, quickness, cognitive abilities, and desire to learn are all best enhanced at different stages of maturation process.

The optimal window of trainability with endurance training occurs at the onset of the adolescent growth spurt. Aerobic capacity training is recommended before athletes reach their peak rate of growth (peak height velocity (PHV)). Aerobic power should be introduced progressively after growth rate decelerates and can be trained well into adulthood.

The optimal window of trainability for strength training for girls is immediately after PHV or at the onset of the menarche, while for boys it is 12 to 18 months after PHV. Strength gains can be made well after the teen years.


The window for optimal skill training for boys takes place between the ages of 9 and 12 and between the ages of 8 and 11 for girls. This is an important window.

The optimal window of trainability for suppleness and flexibility for both genders occurs between the ages of 6 and 10. Special attention should be paid to flexibility during PHV.

Training, competitive and recovery programs should consider the mental, cognitive, and emotional development of each athlete. Beyond the physical, technical, and tactical development — including decision-making skills — the mental, cognitive, and emotional development should also be enhanced.

**"Training of Trainability"  
Sensitivity Phases**

Age	5	6	7	8	9	10	11	12	13	14	15	16	17	18+
Ability to learn motor skills					Red	Red	Red				Red	Red	Red	
			Blue	Blue	Blue	Blue	Blue			Blue	Blue	Blue	Blue	
Ability to react to acoustic & optical stimuli				Red	Red									
			Blue	Blue	Blue	Blue								
Spatial orientation								Red	Red	Red				
		Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue				
Sense of rhythm					Red	Red								
		Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue					
Balance						Red	Red							
					Blue	Blue	Blue	Blue						
Ability to differentiate Movements (in time/space)						Red	Red	Red						
			Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Endurance								Red	Red	Red	Red	Red	Red	Red
		Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Strength									Red	Red	Red	Red	Red	Red
			Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Quickness				Red	Red	Red	Red	Red						
		Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Cognitive abilities						Red	Red	Red						
		Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Desire to learn				Red	Red	Red	Red							
		Blue	Blue	Blue	Blue	Blue	Blue	Blue	?	?	?	?	?	?


  
**Primary window of opportunity    Optimal window for learning**

References:

Istvan Balyi, Ph.D., National Coaching Institute British Columbia, Canada and Ann Hamilton, MPE Advanced Training and Performance Ltd. Victoria, B.C., Canada