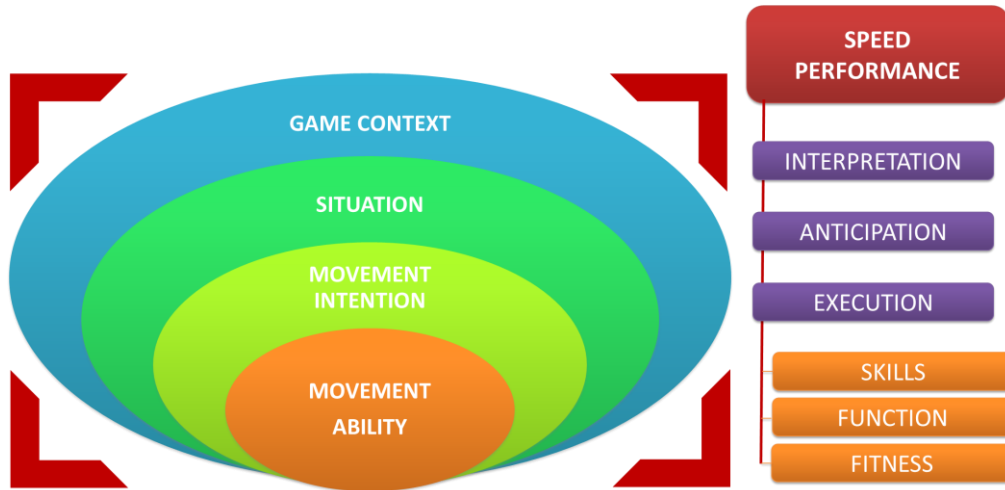


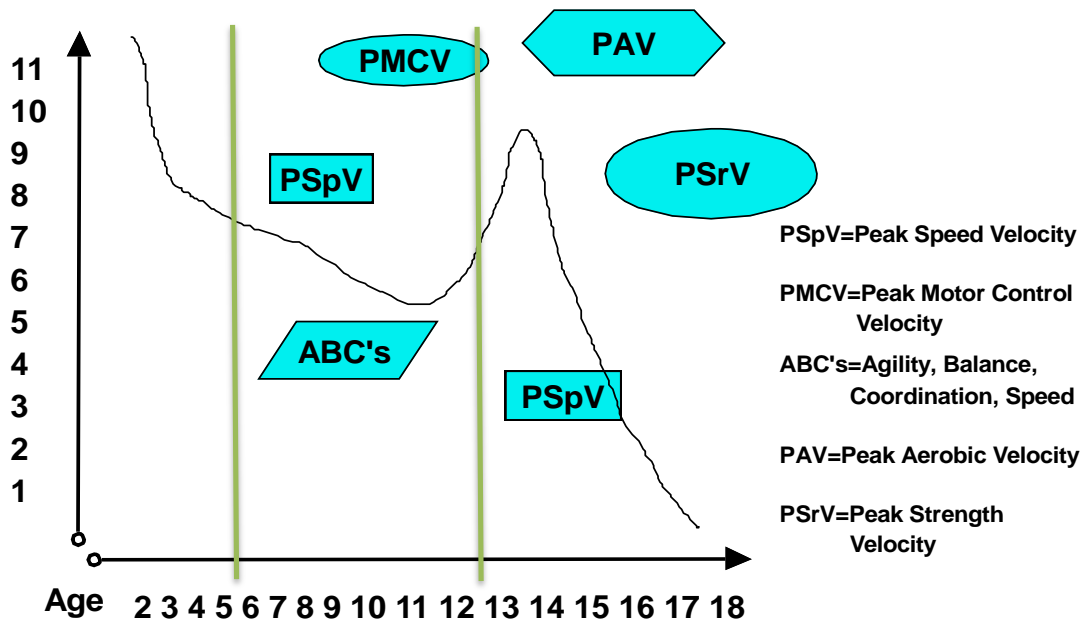
Multi SkillZ – SPEED

Introduction

A. Speed Performance in Sports



B. Speed in the Long Term Development Plan



Windows of opportunity

1. Agility, Balance, Co-ordination & Speed
2. Peak Speed Velocity (1) - Muscle power is very limited under 12 → Peak Speed Velocity (2) speed(-strength)
3. Motor Control

Conclusion: TRAIN THE NEURAL SPEED ABILITY FIRST

C. Game based speed training

Through the game based approach used in Multi SkillZ children are not solely execution fixed movement actions repetitively. The brain is triggered to process the speed actions in relation to varying circumstances (open skilled, interaction with others, depending on behaviour of a ball/balloon).

In Speed drills with a dynamic context a child has to **INTERPRET** (evaluation & controlling), **ANTICIPATE** (planning & calculation) and **REALIZE** (Processing & tuning) the movement:

INTENDED SPEED ACTION = oriented movement action with intended outcome.

This way we accelerate the motor learning and improve the children's ability to perform better under time pressure in different situations. At once they develop the basic crucial look-and-see-strategies that will determine de tactical ability in the future.

TIPS:

- ➔ Create game based speed drills as much as possible
 - External focus
 - Process oriented
- ➔ Adapt the drills childs' ability to stimulate speed. Take into account that, in comparison with adults, children have
 - limited in conceptual understanding (Tactical concepts)
 - lack of situational and specific movement experience
 - non-automated movement techniques

Therefore we cannot practice speed with children through technique- or tactics- depending sport actions

In Multi SkillZ we train speed within the ability of the child in a dynamic context

- General low- threshold motor skills ↔ complex specific techniques
- In dynamic context with interaction when applicapble > development of basic viewing strategies for tactical ability ↔ isolated execution
- Stress the process of the movement organisation in various situations and conditions ↔ repetitive closed automation
- When training speed in isolated situations for the improvement of fast action concepts, keep mixing up the situations and circumstances to get a maximal effect

Speed in Multi SkillZ

A. Overview of the development factors and their sub-factors

Fitness		Skills				Function				Speed			
Games	Training	Orientation	Eye-hand & Eye-foot	Moving & Jumping	Rhythm & Dissociation	Balance	Mobility & Stability	Techniques	Kinetic Energy	Reaction	Agility	Running & Moving	Speed Coordination

B. Development factor Speed

Speed Focus is on improving the speed of motor execution. The exercises are designed to enhance the ability to move and (re)act quickly. The performance velocity or power is emphasized within the set-up.

Following sub-factors are elaborated within Multi-SkillZ in various ways:

1. Reaction
2. Agility
3. Running & moving
4. Speed coordination

'Speed' is dependent on a specific merge of the basis motor abilities Fitness, Skills & Function. The performance speed will occur within the constraints of these basic factors.

D. Sub-factors and training

1. REACTION & ACTION SPEED

- **Reaction speed** = help the children to improve with the R5-principle
 - o Ready: learn them to be alert and attentive
 - o Read: scan the surrounding for cues and focus on relevant information
 - o React: be willing to be fast
 - o Respond: come up with your best (learned) actions as fast as possible
 - o Recovery: an action almost never comes alone, be ready for the next one
- **Fast brain action concepts** > maximal speed execution, no resistance or even accelerated execution (high speed contrast training) to develop fast brain action concepts

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2. AGILITY

Agility = manoeuvrability under time pressure in limited space (less than 2 meters)

- Footwork
- Short distance change of direction & deviations
- Twist & turns
- Trunk & upper body manoeuvrability

It's not about power, it's all about **QUICKNESS**

- Emphasis is on rapid compact movement and displacement
- Short load-to-unload actions and smaller amplitude
- High frequency and good reactivity
- Keep good stability and recover body posture immediately

3. RUNNING & MOVING

Acceleration, deceleration and change of direction with displacements over larger distance (more than 2 meters)

- Various types of running in a variety of situations
- Start, Sprint, Stop, Turn, Deviate, Jump, Cross-over, Side-steps, ...
- Integration of motor skills (before, during after) and crossing of obstacles

Not an 80% speed performer, but an **60%-100% SPEED PERFORMER**

- Emphasis is on fast displacement with reactive power
- Intense load-to-unload actions and large amplitude
- Change of rhythm, stride frequency & length according to situation
- Controlled explosiveness with good balance and crossed kinetic chain alternation

4. SPEED COORDINATION

Co-ordination, handling and action planning process is put under time-pressure.

- High speed motor control
- Fine, complex and a series of motor tasks are stressed

It's not about muscle power, It's all about **BRAIN POWER**



Coach2Competence
ACTIVATE YOUR POTENTIAL

- ➔ Acquiring high-speed control in performing complex movements and several actions
- ➔ Fast coupling of actions = switch in attention/focus, intention & action planning
- ➔ Intense loading of the working memory of the brain (great for implicit learning)
- ➔ End goal = perform drill correct with control and overview in a relaxed way

Additional information

A. Force-velocity curve and training

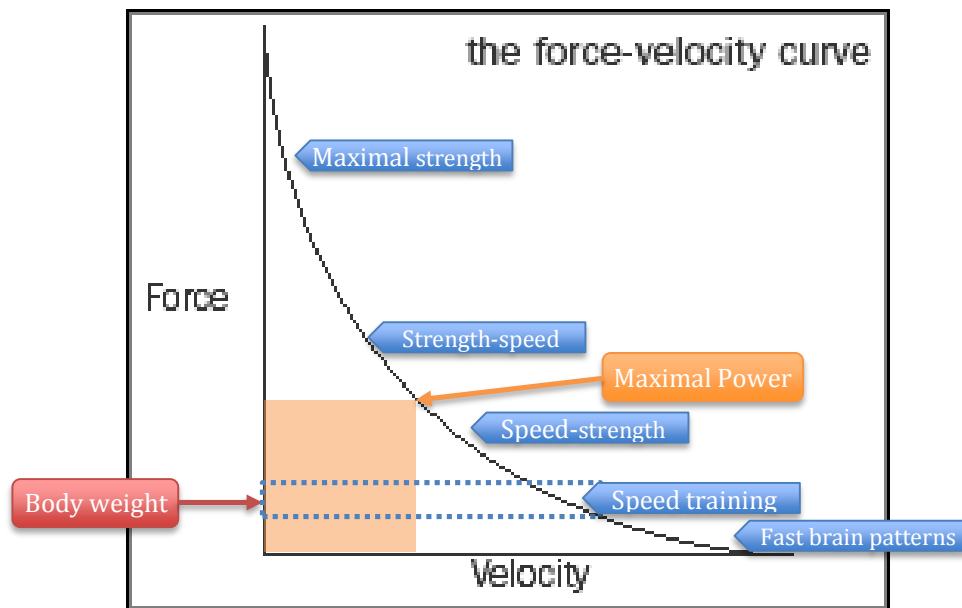


Figure: The relationship between force and velocity, based on the work of Hill (1953).

A. Availability of energy for Speed in Children

The primary energy supply system for high speed movement actions is the ATP-CP system. As the name suggests it consists of adenosine triphosphate (ATP) and phosphocreatine (PC).

This energy system provides immediate energy through the breakdown of these stored high energy phosphates. If this energy system is 'fully stocked' it will provide energy for maximal intensity, short duration exercise for between 10-15 seconds before it fatigues. In an all-out sprint this is only 7-9 seconds.

SUBSTRATE	Values in rest		Use during exertion
	Muscle concentrations in nmol/kg wet weight	Comparison with adults	
ATP	3,5 - 5 nmol/kg	No change with age	Same as in adults
CP	12 - 22 nmol/kg	Lower with children	Same or less as in adults
GLYCOGEEN	45 - 75 nmol/kg	Lower with children	Much less than in adults

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TOTAL TRAINING APPROACH FOR THE DEVELOPMENT OF SPEED

	locomotor control	co-ordination	balance	technique	fast brain	agility	run & displacement	reactive power *	functional strength	strength support **
7-8 y	Through play	Through play				Through play	Through play	Through play		
CO / PHYS : General !!!neural trainability!!! speed, balance, agility, quickness	movement abilities & handling the ball through play, ball games, variation in situation solving	running, jumping, dissociation, fine motor control TIME PRESSURE				1x / Wk 3-4 exercises 1 set / R= 2min 2-4 reps / R=x4-5 up to 10 sec Volume = 10-15 reps	1x / Wk 3-4 exercises 1 set / R= 2min 2-4 reps / R= x4-5 up to 7 sec Volume = 10-15 reps	1x / Wk 3 exercises 1 set 5-10 reps		
9-10 y	general variation and progression	broad development / situation solving	Through play	INITIATION	general frequency / (re-)action	general agility	general start-stop, run-displace	speed plyometrics / technique	body awareness	trough play / initiation
CO / PHYS : General !!!neural trainability!!! speed, balance, agility, quickness	movement abilities & handling the ball through play, ball games, variation in situation solving	running, jumping, dissociation, fine motor control TIME PRESSURE	static & body control / dynamic & movement control	body awareness / initiation general and specific techniques (throwing - running - jumping)	1-3x / Wk 2-4 exercises 3-4 sets 6-8 reps or < 4"	1-2x / Wk 3-4 exercises 1 set / R= 2min 3-5 reps/R=x4-5 up to 10 sec Volume = 12-20 reps	1-2x / Wk 3-4 exercises 1 set / R= 2min 3-5 reps/R=x4-5 up to 7 sec Volume = 12-20 reps	1x / Wk 3 exercises 1 set 5-10 reps	proprioception	play: push,pull,lift,carry - climb,hang,swing - roll,crowl,lean - glide,ride - jump / submaximal strength
11-12 y	general and specific variation - progression	situation solving / instruction	off court techniques	REFINING & PERFECTING	general & specific frequency / (re-)action	general agility	general start-stop, run-displace	plyometric speed / technique	technique / body awareness	technique / preparation
CO / PHYS : General & Specific !!!neural trainability!!! co-ordination, speed, balance, agility, quickness	movement abilities & handling the ball through play, ball games, variation in situation solving / on court speed drills / match play	running, jumping, dissociation, fine motor control coordinative base for physical factors TIME PRESSURE	squat (bi- & unipodal) technique and transfer to general and specific movements (static >>> dynamic)	refining & perfecting general and specific techniques >>> stabilisation and automatization (throwing - running - jumping)	1-3x / Wk 3-5 exercises 3-4 sets 6-8 reps or < 4"	1-2x / Wk 4-5 exercises 1 set / R= 2min 3-5 reps / R=x4-5 up to 12 sec Volume = 15-25 reps	1-2x / Wk 4-5 exercises 1 set / R= 2min 3-5 reps / R=x4-5 up to 8 sec Volume = 15-25 reps	1x / Wk 3-4 exercises 2 sets 8-12 reps	correct kinetic chains: control / co-ordination / proprioception >>> coordinative endurance (local and global stability)	general strength techniques / trunk stability and strength / basic strength programme
13-14 y	general and specific variation - progression	technical optimization & play	physical & specific APPLICATION 1	physical & specific APPLICATION 1	general & specific frequency / (re-)action	general & specific agility	general & specific start-stop, run-displ.	add speed -strength plyometrics	technique / strength preparation	Sub-maximal/technique
PHYS / CO : General & Specific !!!neuromuscular trainability!!! speed-strength Ø musculo-skeletal Ø	progression through complexity and TIME PRESSURE	more physical stimuli (speed, strength, balance) / technical transfer from off court techniques to specific Te/Ta situation (e.g. "bazooka")	general and specific techniques more physical / power techniques / transfer to Te/Ta situation (service - on court movement - strokes)	1-2x / Wk 4-6 exercises 3-4 sets 6-8 reps or < 4"	1-3x / Wk 5-8 exercises 1 set / R= 2-3min 3-6 reps / R=x4-5 up to 12 sec Volume = 20- 35 reps	1-3x / Wk 5-7 exercises 1 set / R= 2-3min 3-5 reps / R=x4-5 up to 8 sec Volume = 20- 30 reps	1-2x / Wk 4-5 exercises 1 set / R= 2-3min 3-5 reps / R=x4-5 up to 9 sec Volume = 25-45 reps	1-2x / Wk 4-5 exercises 3 sets 12-15 reps	correct kinetic chains: co-ordination / proprioception / endurance >>> strength (local and global stability)	General strength program eccentric load Transfer to speed(-strength) Complex training
15-16 y	technical optimization & play	technical optimization & play	physical & specific APPLICATION 2	physical & specific APPLICATION 2	general & specific frequency / (re-)action	general & specific agility	general & specific start-stop, run-displ.	add strength-speed plyometrics	muscular adaptation / periodisation	Sub-maximal
PHYS / CO : General & Specific !!!muscular trainability!!! strength-speed Ø musculo-skeletal Ø	progression through complexity and TIME PRESSURE	more physical stimuli (speed, strength, balance) / physical transfer from off court techniques to specific Te/Ta situation (e.g. "bazooka")	general, specific and power techniques more physical / transfer to Te/Ta situation (service - on court movement - strokes)	1-2x / Wk 4-6 exercises 3-4 sets 6-8 reps or < 4"	1-3x / Wk 6-10 exercises 1 set / R= 2-4min 4-8 reps / R=x3-5 up to 14 sec Volume= 30-50 reps	1-2x / Wk 5-8 exercises 1 set / R= 2-4min 4-8 reps / R=x3-5 up to 9 sec Volume= 25-45 reps	1-2x / Wk 5-6 exercises 3 sets 12-15 reps	correct kinetic chains: co-ordination proprioception / endurance / strength >>> explosivity (local and global stability)	General strength program eccentric load Transfer to speed(-strength) Complex training	
17-18 y	technical optimization & play	technical optimization & play	REHEARSAL for physical application	REHEARSAL for physical application	specific frequency / (re-)action speed	periodisation	periodisation	periodisation	periodisation	periodisation
PHYS / CO : General & Specific !!!overall trainability!!!	progression through complexity and TIME PRESSURE	rehearsal for power optimization and prevention / reinforce motor programmes through physical stress	rehearsal for power optimization and prevention / reinforce motor programmes through physical stress	1-2x / Wk 4-6 exercises 2-5 sets 6-8 reps or < 4"	1-3x / Wk 6-10 exercises 1 set / R= 2-4min 5-10 reps/R=x3-5 up to 14 sec Volume= 35-65 reps	1-3x / Wk 5-9 exercises 1 set / R= 2-4min 5-10 reps/R=x3-5 up to 10 sec Volume= 30-55 reps	1-3x / Wk 6-8 exercises 4 sets 10-15 reps	correct kinetic chains: proprioception / endurance / strength / explosivity / speed (local and global stability)	Build strength base Transfer to power Complex training	
> 18 y	technical optimization & play	technical optimization & play	REHEARSAL for physical application	REHEARSAL for physical application	specific frequency / (re-)action speed	periodisation	periodisation	periodisation	periodisation	periodisation
PHYS / CO : Specific & General !!!overall trainability!!!	progression through complexity and TIME PRESSURE	rehearsal for power optimization and prevention / reinforce motor programmes through physical stress	rehearsal for power optimization and prevention / reinforce motor programmes through physical stress	1-2x / Wk 4-6 exercises 2-5 sets 6-8 reps or < 4"	1-3x / Wk 6-10 exercises 1 set / R= 2-4min 5-10reps/R=x3-5 up to 16 sec Volume= 40-80 reps	1-3x / Wk 5-9 exercises 1 set / R= 2-4min 5-10reps/ R=x3-5 up to 10 sec Volume= 35-70 reps	1-3x / Wk 8-10 exercises 4-5 sets 12-15 reps	correct kinetic chains: proprioception / endurance / strength / explosivity / speed (local and global stability)	Build strength base Maximal strength Transfer to power Complex training	

* personal changes to Chu D, 2003, Increasing power in tennis, in Reid M; Quinn A; Crespo M (eds), Strength and conditioning for tennis, Roehampton : International Tennis Federation, 137-148.

** Strength training for children

