SWIMMING

Step by step from beginner up

There is a large scientific literature that shows how the maximum performance requires at least 10 years of training to improve technically, physically, tactically.

(*10.000 Hours*)

A confusing factor in talent selection is the confusion between chronological and biological age.

What seems like a talent is only a physically more mature child

Youth athletes improve rapidly thanks to their growth and the speed of acquisition of new skills ...

IMPROVING PERFORMANCE

from the very beginning

Gradually increasing sets/drills/sessions aimed to improve competition's requirements

Gradually increasing sets/drills/sessions that stimulate the physiological needs of the race

Stages

BOYS		**GIRLS**
7-8	Initial preparation (not training)	6-7
9-11	Basic training (stimuli)	8-10
12-15	Partially specialised training	11-14
16-18	Highly specialized training	15-17
19-21	Max results	18-20
>21	Keep your best results (… improving)	>20

Seasonal Loading Plan for Swimmers

Age groups	Weekly Sessions	Minutes per session	Weekly Km	Seasonal Km
9-10 Girls 10-11 Boys	3-5	45'-90'	8-16	300-600
11-12 Girls 12-13 Boys	4-6	105'-120'	15-25	600-1100

WEEKLY SCHEDULE LOADS' DISTRIBUTION

9-10 Girls 10-11 Boys	Sessions Nr.		Mt. per Session Max		Training Time	Physical effort	Method
AGE	9/10	10/11	9/10	10/11			
Technique Coordination	4	4/5	800	1200	30' - 40'	Moderate	Extensive and interval
Aerobic Endurance	2	3	1000	1600	25' - 35'	Medium	Extensive and interval
Anaerobic Threshold	0	1		800	15' - 20'	High	Extensive and interval
Speed	1/2	3	200	300	25' - 30'	Max	Ultrashort dist.
Vo_2 max	0	0					
Lactate Tolerance	0	0					
Peak Lactate	0	0					

WEEKLY SCHEDULE LOADS' DISTRIBUTION

11-12 Girls 12-13 Boys	Sessions Nr.		Mt. per Session Max		Training Time	Physical effort	Method
AGE	11/12	12/13	11/12	12/13			
Technique Coordination	5	6	1000	1500	30' - 45'	Moderate	Extensive and interval
Aerobic Endurance	2	3	1500	2000	40' - 50'	Medium	Extensive and interval
Anaerobic Threshold	1	2	1000	1500	20' - 40'	Medium-high	Extensive and interval
Vo_2 max	0	1		1200	15' - 25'	High-very high	Intensive and interval
Speed	2	3	250	350	25' - 30'	Max	Ultrashort dist
Peak Lactate	1	1	200	300	25' - 30'	Max	Short dist (25-50 mt.)
Lactate Tolerance	0	0					

13-14 Girls 14-16 Boys	Sessions	Mt / session	Intensity	Method	Examples
Technique and coordination	6	At least 1000	Low	Extensive	20x50 but 25 too
Aerobic Endurance	Up to 6	2000 – 3000	Average	Extensive	6x400 ** – 10/12x200
Anearobic threshold	2	1500 – 2000	High	Extensive	8x200 (20”) – 16x100 (15”)
Max VO2	1-2	1200 – 1600	Very high	Intensive	10x100 (25”-30”) - 2x4x100 (30”)
Lactic Capacity	0	0			
Lactic Power	1	No more than 300	Max	Short distances extended recovery	6x50 (60”) or 4x75 (1’30”)
Speed	Up to 4	200	Max	Short distances extended recovery	8x15 (60”) 8x25 (1’30”)

Incremental approach/model workouts : km e typology
≠ AGE GROUPS

AGE	Sessions	Time	KM	AE Thresh	Max Vo2	Lact Tol	Lact Power	Technique
YOUTH 15/16	6	2h	± 5	2,5 - 3	1 – 1,5	600/800	200/400	Relevant how + fast
JUN 17 up	6-8	2h 15’ ±	± 7	Up to 3,5	1,6 – 2	800 - 1k	400/600	Relevant how + fast

Initial Training

6/8 YEARS

ENERGY zones : Anaerobic a-lactic - Aerobic

GENERAL PREPARATION

- Basic motor pattern

- General and special coordinating capacities

- Speed and rapid strenght of the limbs

- Aerobic endurance

SWIMMING

- Specific coordination factors

- Basic techniques in simplified form

Basic Training

9/11 years

Prevalent energy zones: Anaerobic a-lactic - Aerobic

GENERAL TRAINING

- Rapid strength

- General coordination

- Resistant strength (Trunk - Abdomen)

- Joint mobility (systematic)

- No specialization by race or distance

- Technique and coordination

ESSENTIAL SUGGESTIONS

- No annual periodization (the race is a means, not the aim of the training)

- Work on a weekly microcycle (to properly distribute loads and ensure appropriate recoveries)

Partially specialised training

12/15 years

Energy zones: a-lactic and aerobic, short lactic stimuli.

Fine tuning of techniques while maintaining variability

More complex coordination drills (apply technique in complex and variable conditions)

Beginning specialization

GENERAL ACTIVITIES

Rapid Strength (Specific Muscles)

Strength resistance (general and specific muscles)

Maximum strength stimuli (at the end of this stage. Girls beginning 1-2 years before Boys - No maximum loads yet)

Joint mobility (static and dynamic techniques)

Training and Age

AGES		
6/9	*Development of a multilateral basis where emphasis is placed on coordination, speed and development of overall endurance*	**Playing & Learninig** Recreational motor activity (80%) basic training (20%)
10/14	*Specialization with development of both a condition and a specific technical tactical range*	**Building** General training (50%) Introduction to learning specialized techniques (50%)
15/18	*Optimised training for maximum performance.*	**Performance** General training (30-40%), specialized training (60-70%)
>18	*Senior swimmers - top results*	**Top level** Specialized (100%)

Sensitive stages

AGE	STRENGTH	SPEED	ORGANIC ENDURANCE	COORDINATION SKILLS	JOINT MOBILITY
6-8	Mild intervention on muscle trophism	Gradual intervention	Psychological instability for repetitive and prolonged tasks	**OPTIMAL AGE**	Mild intervention
9-11	Progressive intervention on muscle trophism	**OPTIMAL AGE**	Gradual intervention	**OPTIMAL AGE**	**OPTIMAL AGE**
12-14	Progressive intervention on relative strength (natural load)	Tends to stabilize and then decrease	Progressive intervention (gradually)	Tends to stabilize and then decrease	**OPTIMAL AGE**
15-16	Progressive and gradual intervention (general and explosive strength) with natural load and free weights from low to medium	Tends to decrease	**OPTIMAL AGE**	Tends to decrease (some)	Tends to stabilize and then decrease

TRAINING	< 16 yoa	> 16 yoa
	LEARING PERIOD	SPECIALIZATION
TARGET	Improve EP during the year	Best performance when needed (main seasonal event)
PERIODIZATION	Single	Double - Triple
MESOCYLES STRUCUTRE	Costant	Based on objectives
LOAD CHANGES	Gradual increase	In funzione del max effetto prodotto
USE OF THE MEANS	Didactic	Adaptative aim
EVALUATION	Technical and secondly chronometric	Achieving the PB in the target event
FUNZIONE DELLE GARE	Didactic, learn to compete	Verify planning development
PERFORMANCE (time)	Not main focus	Primary focus

8-9 (+/- 1)	10-11 (+/- 1)
From playing to technique	Technique - Multilateral training
Coordination drills	Coordination drills
Ultra-short sprints	Ultra-short and short sprints
Improvement of basic endurance through splitting of distances	Aerobic improvement with extensive and intensive splitted methods. Distance subject to the technique
Improve starts, turns and underwater	Lacttacid stimuli (long recovery 3’ - 5’)
Development of "tolerance" to physical and mental load. Respecting the needs and characteristics of age	Acquisition of tactical skills for race management. Increased load capacity (physical and mental)
Development of emotional, cognitive and motivational assumptions for high level training (games, relay, challenges)	Relays and challenges with others and with oneself. Race as a mean.
Stroke frequency and length first monitoring. Sprint 15m.	Test - (2000), speed 15mt, lenght and frequency

What to do and what not

YES	NO
Respect the growth of the individual	Propose programs of older (seniors) in a reduced form
Allow the full development of the potential	Precocise some phases of motor development
Keep a high level of motivation	Putting the sport result above everything
Using multilaterality in its various forms	Automating technical gesture in a "rigid" way
Always set achievable goals, but not easy	Setting too ambitious targets

PERIODIZATION 1 MACROCYCLE

For children during the early years of youth age-groups (approx up to 11-12 years of age). Considering a multi-year programming. Duration is the whole season (September/July for very young swimmers/children). We are aiming to improve all the aspects which will be key points for a future competitive senior level.

PERIODIZATION 2 MACROCYCLES

Used in youth age-groups which have regional targets or national age-groups events. Duration 1st macrocycle 25/28 weeks (September/March) 2nd macrocycle 18/21 weeks (March/August)

What to do and what to know

Identify a achievable goal, analyzing the previous performance and the available time

Analyze the relevant literature and stay updated

Analyze athletes feedback and identify the load which let enhance the parameters needed to optimize the performance

Evaluate the present shape of the athlete and the target time for the next period, considering the time at your disposal to reach it

Based on the above points, arrange the next micro-cycles with volumes and the other key-elements.

Is to vary always positive ?

NO Excess of variation could slow down the improvements

The right balance has to be find, which is not that easy and which is not mathematical

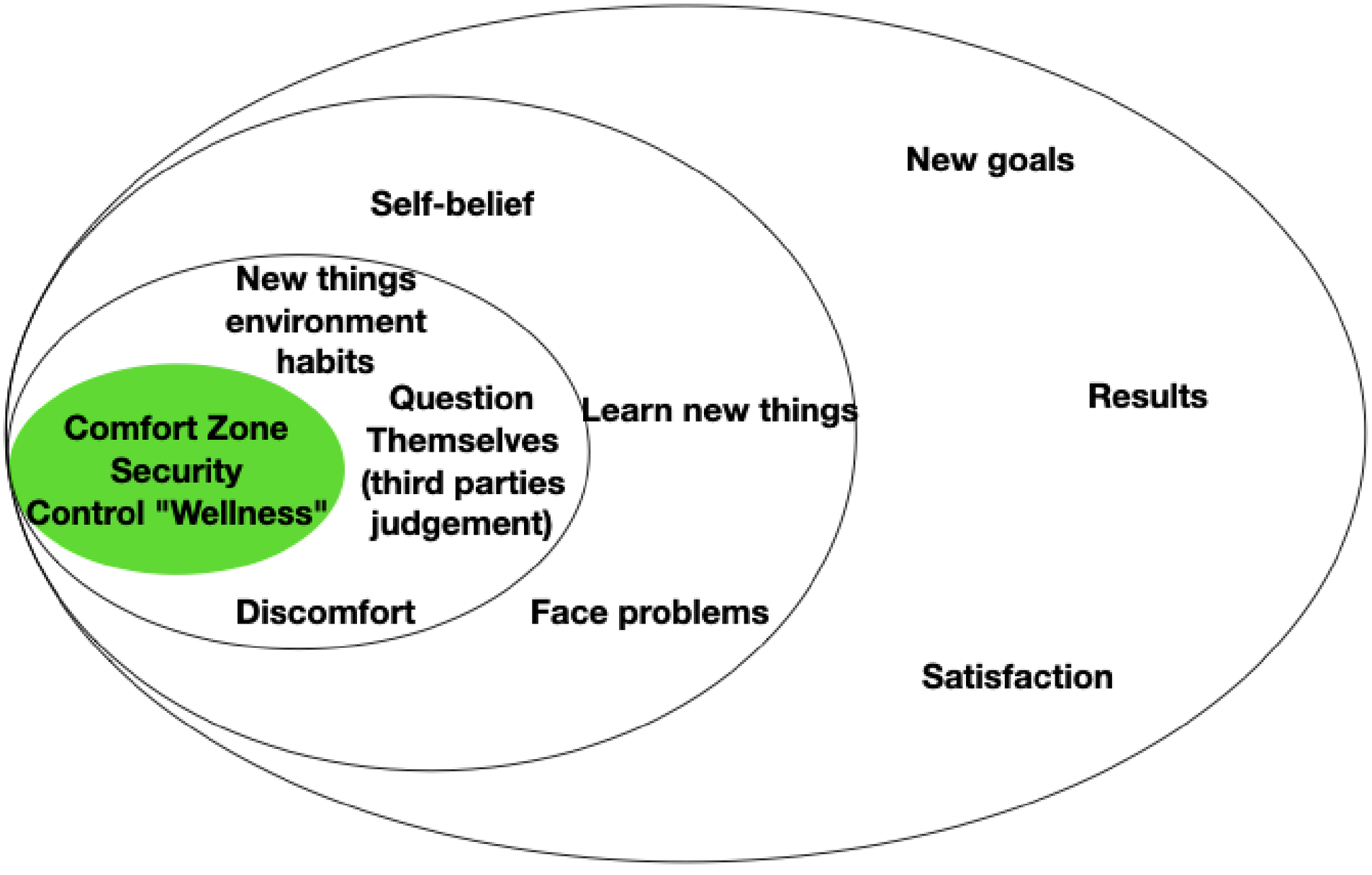
ANYHOW If you are planning in the best way the various typologies of stimuli, there are good chance to succeed

Process to improve

Transition from the so-called comfort zone

overcoming fears/obstacles and unknowns

to increase psycho-physical awareness


New goals
Self-belief
New things
environment
habits
Question
Themselves
(third parties
judgement)
Learn new things
Results
Comfort Zone
Security
Control "Wellness"
Discomfort
Face problems
Satisfaction

Young Swimmers

The majority of young athletes (80%) have to work on DS before first of the frequency.

It is therefore primary to reduce the number of strokes and the distance covered earlier than frequency.

Efficiency of the propulsion (EP) improves starting from this point.

EP - Propulsion efficiency

Much of the mechanical work is used to open the water

The global energy efficiency is 8-10%

The energy cost represents the energy used to cover a certain distance. It’s expressed in Kilojoules (kJ) per meter and increases exponentially while increasing the speed

Efficient Propulsion

An immediate indication of propulsive efficiency is represented by the distance covered in each stroke cycle (DS)

Better athletes have a higher DS (stroke distance) index

Speed = DS x FQ

Crucial correlation between frequency and distance per stroke

INCREASING SPEED

The increase in speed will always result from a change in the distance covered with a stroke cycle and/or with the increase in frequency.

Of course you can improve the result with a better execution of turns, start and with a more refined technique.

MEN - WOMEN

The average frequency of SENIOR swimmers (World Championship, Olympics) and JUNIOR is about +0.4 cycles per minute which corresponds in percentage to +0.8 %

The average frequency of SENIOR swimmers (World Championship, Olympics) and JUNIOR is about -0,8 cycles per minute which corresponds in percentage to -1,7 %

The difference in times between Senior International and Junior finalists is as follows

Time

WOMEN -4,9 %

MEN -4,9 %

The frequency differs instead

WOMEN -1,7 %

MEN +0,8 %

Key factors

to achieve the performance

details can make difference

…. about strategies, tactic etc

Determine a race model with an ideal stroke number frequency for each athlete.

Working on the underwater phases.

Get the max benefit without this affects the final part of the race

Verify the relationships between different morphologies and different ways of applying the technique.

Different technique for different types of athlete ? Being able to identify at any time the state and efficiency of the athlete during the season.

Managing the distance

Difficulty in sharing with the athlete

Motivational aspect (psychological)

Difficulty in managing extensive training to consolidate the technical gesture and **minimize the energy cost**.

<u>Race-Pace aimed at improving endurance/technique at race speed</u>

Don’t tell your athlete to “try”.

In a race over 50 meters, do not ask your athletes to go out at max speed, except for particular tactical reasons.

Set the right split time of the athlete. And **work on the come back**

Never compromise the technique. An early anaerobic overload is often of little importance from the chronometric point of view, while on the contrary it compromises the technical and propulsive efficiency for all the remaining distance of race

The tenths are not all the same. A few tenths faster in the first split, will compromise the finish from a technical point of view both in the amplitude and in the stroke frequency

The real tenths are the finals. And' much greater the advantage that derives from an anaerobic reserve in the final of a race from 100 meters that not what you can accumulate in the first 50.

The lactate accumulated early, induces early fatigue and decline of a correct technique and propulsive efficiency.

Pay attention to the finish. The races are won in the last 50 meters and often in the last 30 meters

Train your middle-distance guys to **negative**. Make them able to implement the negative-split in distances from 400 to 1500 sl, maintaining for the last 100 or 50 meters the anaerobic reserve saved with this tactic

Swimming the final split just with aerobic “engine” and an empty anaerobic tank is not winning.

Consolidate the advantage. If your athlete is better than others do not play it by ear with tactics. The others have to take a risk. Consolidate their capacities without jeopardising a major performance. The result often comes from a proper race conduct.

Manage the qualities in which you are superior. If your athlete is fast, you will not need to force to be ahead in the middle of the race. If it is preceded at that moment, it will probably mean that others have spent a lot to keep up with your athlete and the bill will be payed at the end of the distance even in a very brutal way

Check the half-distance split (and calibrate it) through the race for example in the 200. We sure have to consider whether we are observing a sprinter 50/100 or a sprinter 100/200.

Talk to your athletes about the race strategy by educating them, testing them, checking whether they understand it mentally, biomechanically and technically.

The verbal feedback of the athlete is fundamental, as is the feedback that comes from the detection of frequencies, amplitudes, times, heart rate and, where possible, the detection of lactic acid produced.

DEVELOPING sets

DEVELOPING AEROBIC ENDURANCE

VOLUME	MT 1000-1200 up to 2000-2400
TIME	From 30’/35’ up to 40’/45’
DISTANCES	(50) – 100-200-400

Set EXAMPLES:

2 X (10x50) FR
Rest = 15’’ ⟶ 10’’
+ 30’’/60’’ between sets

2 X (8 X 100) FR
Rest = 15’’ ⟶ 10’’
+ 30’’/60’’ between sets

2 X (400+300+200+100) FR
30’’ 20’’ 15’’
+ 30’’/60’’ between sets

ATTENTION to internal LOAD

ANAEROBIC THRESHOLD

VOLUME	MT 800 up to 1600
TIME	From approx 20’
DISTANCES	(50) – 100-200-(300-400)

Set EXAMPLES:

4 X (3 X 100) FR = 2 faster (1’40’’) +1 slow (1’30’’)

2 X (6 X 100) FR - Rest around 20’’
+ 30’’/60’’ between sets

ANAEROBIC ALACTACID - CP fuel

VOLUME	around 200/300 m
TIME	10 seconds
DISTANCES	10-12,5-15 m

Set EXAMPLES:

2 X (6 X 25) FR ½ fast ½ slow 1’/1’10”
+ 2’ active recover

12 x 25 SL 15mt fast 10mt slow

3x (6 x 25) 15mt fast 10mt slow

Developing with:
free
fly

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underwater

VO2 MAX

VOLUME	around 400/600
DISTANCES	50-100 m

Set EXAMPLES:

8 X 50 SL
20’’/30’’ rest
3 fast + 1 slow

2 x 200 broken 50
10’’ rest + 2’ between repet.

6x100
30”/40” rest

4x (100 + 50)
30” after 100 - 20” after 50

ANAEROBIC stimulation

VOLUME	200/300 MT
DISTANCES	25-50-75 m

Examples : **RELAYS**

2x25 + 1x50 with start and full recover up to 20’

4/6 x 75 Starting 3’

4/6 x 50 with start (2’/2’30’’)
Rest passive - less reduction of LACTATE
Rest active - remove LACTATE much faster

Something good to remember

% Involvement of major types of training in different athletes according Sweetenham

SWIMMER	AEROBIC ENDURANCE	AEROBIC POWER	ANAEROBIC
YOUNG	**70**	**20**	**10**
SPRINTER	50	20	30
MIDDLE DISTANCE	60	30	10

Performance's Limiting Factors according Maglischo

- **50** - **TECHNIQUE** – Aerobic Metabolism – Available Phosphocreatine

- **100/200** – **TECHNIQUE** – Acidosis' buffering capacity of anaerobic metabolism and maybe CP available

- **Middle-distance and Long-distance** – **TECHNIQUE** – Acidosis' buffering capacity – Aerobic metabolism level

ASSOCIATION

Long Term Swimmer Development Model

Chronological Age: 0 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19+

Female

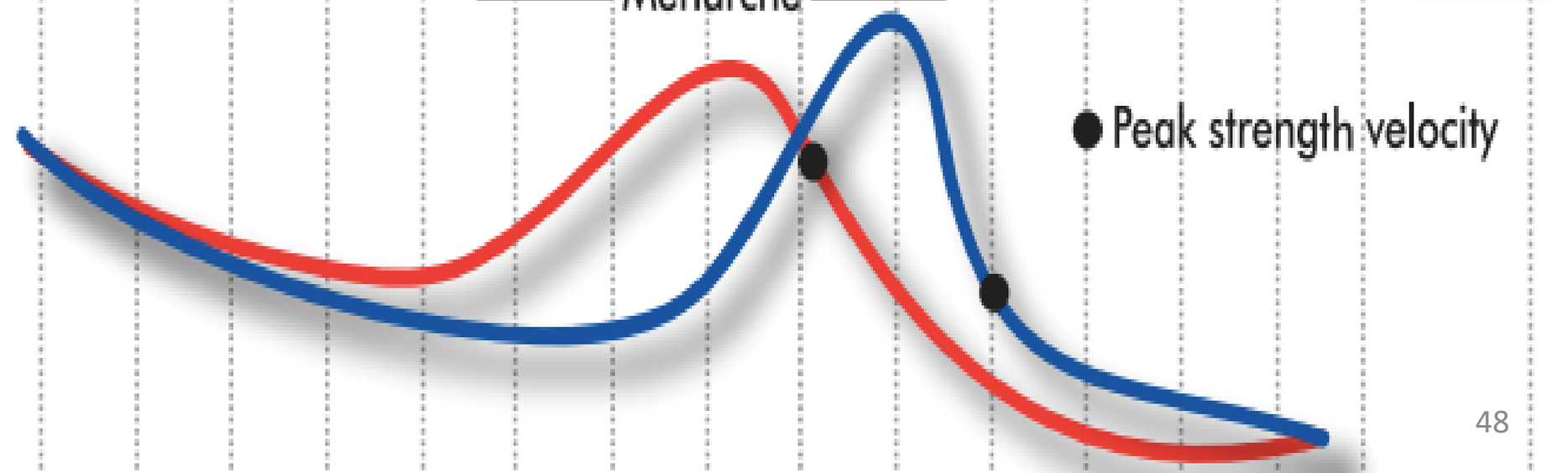
Long Term Athlete Development Stage

- FUNdamentals
- Learn to Train
- Train to Train
- Train to Compete
- Compete to Win
- Active Start
- Active for Life

Male

- FUNdamentals
- Learn to Train
- Train to Train
- Train to Compete
- Compete to Win

Approximate growth velocity curve for average maturer



Female
Male

Primary Training Emphasis

Chronological Age: 0 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19+

- AGILITY
- BALANCE
- COORDINATION
- FLEXIBILITY
- SPEED OF LIMB MOVEMENT
- BASIC TECHNIQUE
- SPEED
  MAXIMUM EFFORTS OF 8 SECONDS AND LESS
- AEROBIC ENDURANCE
- TACTICS AND DECISION MAKING
- AEROBIC POWER
- STRENGTH ENDURANCE
- ADVANCED TECHNIQUE
- SPEED ENDURANCE
  MAXIMUM EFFORTS OF 8-90 SECONDS
- MAXIMUM STRENGTH
- MUSCULAR POWER

Female
Male

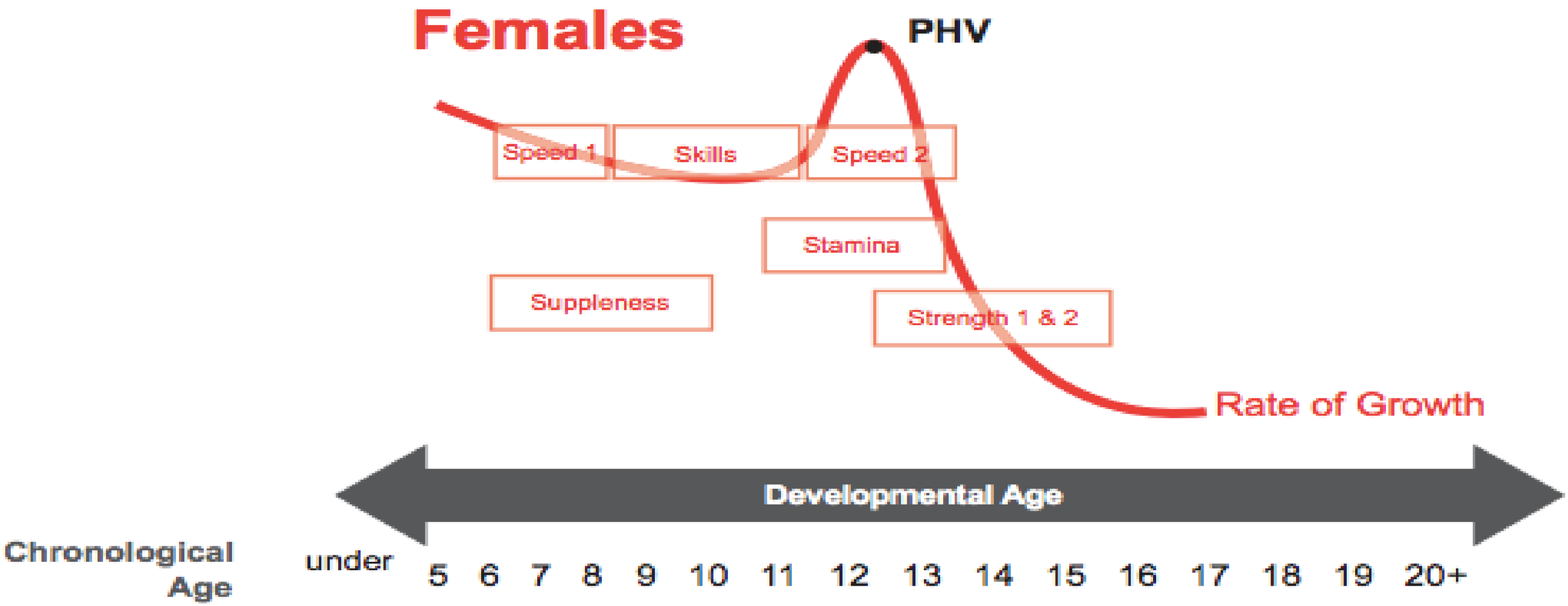
Primary Emphasis

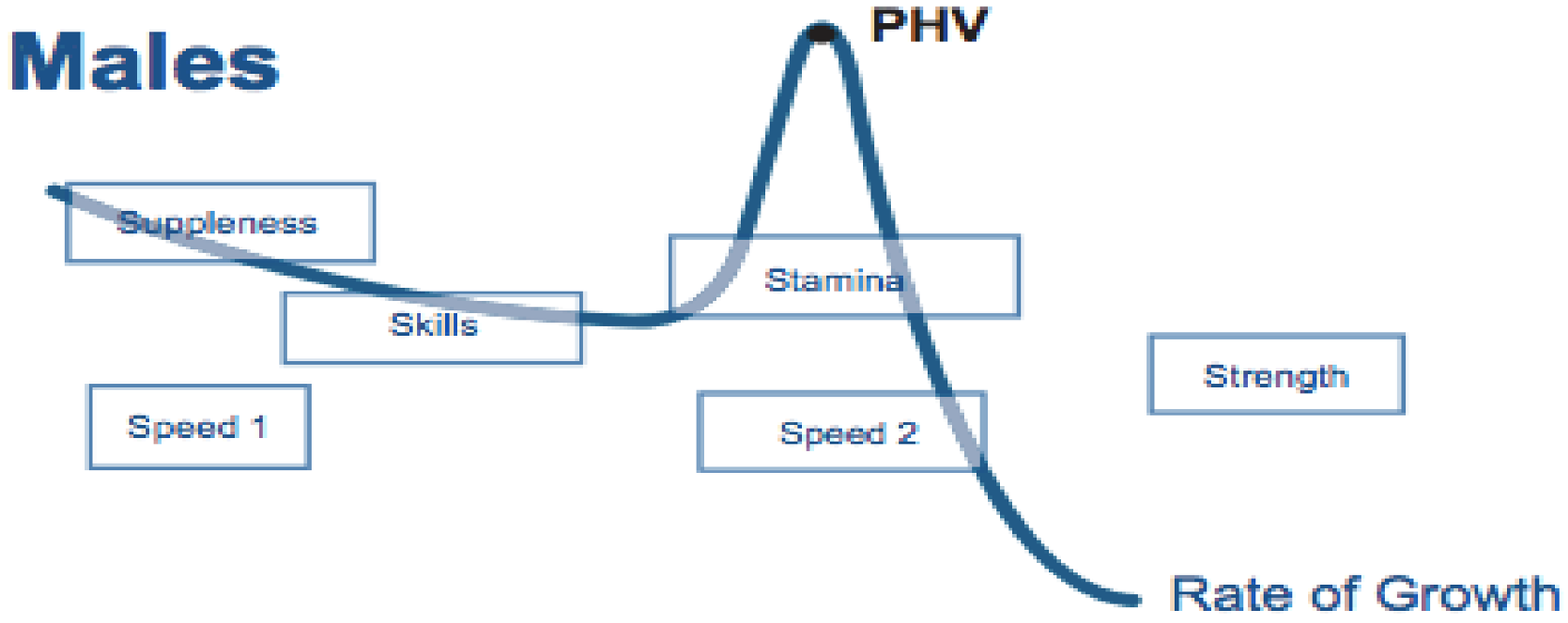
Introduce or Maintain

Peak Height Velocity

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

Females appear to experience the onset of the adolescent growth spurt and PHV earlier than males, though males appear to grow more during this period.





Dr. Ivan Bayli, Dr. Richard Way, and Dr. Colin Higgs

Physical, Mental - Cognitive, Emotional Development

Peak Height Velocity

Motor skill and athletic development can be broken down into five categories:

- Stamina **
- Strength **
- Speed **
- Skill
- Flexibility.

These categories are always trainable, but improve at a greater pace if the proper workouts are applied during the right periods of development. These periods are referred to as optimal windows of trainability.

Stamina

The amount of oxygen a person can consume while exercising increases naturally during age 8 – 15 by 150% in boys, and 80% in girls. The period when a person is the most sensitive for training is at the onset of the growth spurt. **Boys show an increase in lung capacity after their greatest increase in height (Peak Height Velocity; PHV)**. This window usually lasts from around age **16 – 18**. Female lung capacity development peaks around age **14**, with smaller, steady increases until age **16**. Bayli's research found that beginning one year prior to the PHV and continuing training thereafter, lung capacity was effectively increased above the norm attributed to age and growth.

Training

At the start of the growth spurt, sports that require a lot of stamina should prioritize lung capacity during continuous training with long, slow, distance exercises. **Once the growth spurt decelerates, training should be focused on aerobic power**: the highest amount of

Strength

Children are able to produce strength gains before the growth spurt, but only in regards to relativity to their body weight, not absolute strength. This means as children grow, their strength increases at the same rate at which they grow until they reach their growth spurt. **In females, the optimal window of trainability begins at the onset of menarche. In males, it is 12 to 18 months after the growth spurt.**

Training

Athletes that are going to engage in strength training should be taught proper weightlifting form before PHV to get maximum results during the window of optimal trainability. Olympic lifting techniques and free weight exercises can be introduced at that time.

Speed

There are two optimal windows for speed trainability. In females, they are from around age 6 – 8, then age 11 – 13. In males, the windows are from age 7 – 9, and age 13 – 16. The first window coincides with the development of the central nervous system. This makes it a sensitive period to train agility and change of direction because of the muscular control and reaction development necessary to be agile.

Training

During the first sensitivity period, agility training should be low volume and high intensity: less than five seconds in duration with a full recovery between sets. Speed training should start only in the second sensitivity period. There are two components to speed training: Anaerobic alactic power, and anaerobic alactic capacity. Think of anaerobic alactic power as your top speed, and anaerobic alactic capacity as the duration you can perform at top speed. The anaerobic alactic energy system is responsible for providing short, massive bursts of energy. Training during the second sensitivity period should be sets of 5 – 20 seconds, with a full rest between sets.

Speed training should be done at every training session. The best time to train speed is toward the end of the warm-up or immediately after it because of the lack of central nervous system or metabolic fatigue. When training speed, you should always keep the volume low, and have a full recovery between sets. To maximize effectiveness, accelerations should be done over a short distance with a focus on proper posture and position.

Skill

Skill is most trainable between the ages of 5 and 12, with peak motor skill development occurring between age 8 -11 for females, and 9 – 11 for males. Although skills are always trainable, skill trainability greatly declines after age 12.

Fundamental skills should be acquired before age 11 for girls and 12 for boys. Some examples of fundamental skills are agility, balance, coordination, jumping, throwing, catching, and kicking, among others. If the skill development foundation isn't properly developed early, it could lead to trouble with skill development later in life.

Training

Early sport-specific training can lead to a lack of broader skill development, and hinder future athletic ability. That's why it is important to have balanced fundamental skill set development, which can be achieved by participating in a wide variety of sports at a young age.

Flexibility

The sensitivity period for flexibility occurs before the growth spurt (usually age 9 – 12).

Training

Information on how to best develop flexibility is limited, but a good place to start is the warm-up before a training session.

Dynamic (moving) stretches should be done before every training session.

Static (stationary) stretches should be limited to 2 hours before or 2 hours after a workout.

Dr. Ivan Bayli, Dr. Richard Way, and Dr. Colin Higgs

Dry land activities

complementary or replacement of pool sessions for swimmers

WHAT

In-depth analysis of basic motor schemes

Coordination

Joint mobility

Rapidity

Dexterity

Drills aimed at the strength (stimuli) at natural load (adapted to physical abilities)

exercises

groups

HOW

Individual and circuit

Exercises in pairs and

Games, challenges, relay

Motor combinations with massive stimulation for coordinating abilities (changes of rhythm - matching different movements)

In swimming there is a massive development of the muscles that oversee the propulsion (shoulder’s intra-rotators)
Almost all the the extra-rotators cuffs are hypotonic and undergo a continuous elongation by the antagonists.

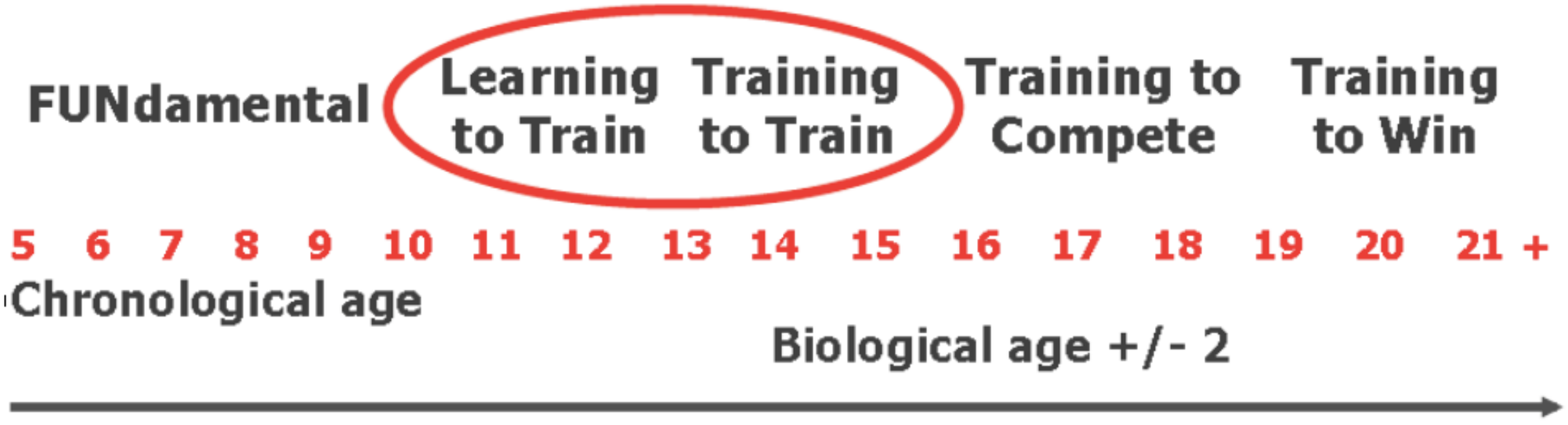
This leads to paramorphic attitudes (kyphosis) or inflammations for muscles and tendons. Prevent with extra-rotational muscle exercises

FUNDAMENTAL RULE

CORE STABILITY
CENTRIFUGAL DEVELOPMENT

Strengthening starting from the trunk muscles to allow a solid support to the column, then intervene on limbs

LTAD - LONG TERM ATHLETE DEVELOPMENT



THE MOST IMPORTANT TRAINING STAGES

Robertson & Hamilton, Coventry University 2008

COACH

The simpler we are, the easier we can analyze the results

Considerations

- What kind of unconscious and non verbal messages do I send to the athlete ?

- In the moments before the race how do I talk to the athlete ?

- The number and quality of technical comments ?

- Enough space for the athlete to express himself ?

- Adequate positive reinforcement to increase the confidence of the athlete

- Fair emphasis on the result of the race ? (the race is not just time)

- Right evidence of the technical and tactical aspects to focus on now and in the future ?

About endurance and young

Between 7-8 years of age the body responds to the effort of duration in a quantitative way, that is, by increasing only the heart rate and respiratory rate. This is because cardiac and lung volumes are still reduced.

The real limit to the resistance in the child derives, however, from the natural low propensity to monotonous and prolonged effort and, therefore, to the lack of always different and playful stimuli.

At 9-10 years you can already start a progressive general endurance training. The maximum natural increase in endurance is around 15-16 years, while at 17-18 years the maximum endurance capacity is reached.

About anaerobic and young

Lactic acid anaerobic activity in the developmental age is not appropriate and the answer lies in LDH, that is the enzyme "lactic dehydrogenase", which is responsible for the production and disposal of lactic acid.

If lactacid activity is proposed in the stages of development in which this enzyme is still poorly present (<15-16 years) a double negative effect is produced :

1) the low production of lactic acid means that the training of anaerobic does not give rise to significant improvements (and far from comparable to those given by aerobic adaptations)

2) the poor ability to recycle the amount of lactic acid however produced can cause damage to the boy.

3) Technique, in situations of extreme stress, is significantly affected.

Youth preparing to be Senior

Strength training can become specific and start already in the water with the use of aids such as parachute, paddles and elastic. Otherwise it can be functional to work in water and then be done dry. (For a very young swimmer "strength" are even a few dolphin strokes).

"Age-groups" athletes must prioritize the development of flexibility and mobility

The stability exercises for the "abdominal-dorsal" belt (core) will provide a kind of platform on which technical skills/abilities will be built in all strokes. The prevention of injuries (shoulder) can be implemented with the use of elastic bands of different resistances.

TAPERING: we carefully consider the number of personal records that your younger athletes swim despite being in periods that provide a substantial training load. The first question we will have to answer is whether tapering is necessary for the younger groups. The elements to be considered are:

The sex of athletes
Distance - sprinters - middle-distance. Breast strokers as a specific group
Level of physical maturity and body type
Matured training experience and recent history of sustained training
Requirements for the following groups

Prevalence of aerobic training and progression in the acquisition of skills. Varied training sets and on different strokes. Be not only a coach, but a guide. Be not only a guide but an educator.

Progression of the load, adequacy of the load to the age of the athlete, increase of the sessions and their duration, education to the detection of FQ, the number of cycles per distance, the use of the most varied supports.

Increase in the number and complexity of dry-land sessions, increase in exercises for strength of abdominal and back muscles. Introduction of an elaborate dry-land program.

The working week will see about 70-80 % devoted to aerobic work, 15 % to work anaerobic and 5-10 % to work with speed.

To be included in the program also work of legs SUB both extensive and intensive, strart with 10/15/20 meters, turns both when they are rested and when they are tired (detection T. es. 5 in 10 out or 5 in and 10 out). Extensive aerobic resistance drills also on the back.

Kick sets at a great pace with the possibility to dedicate to the work of legs up to 15% of the total volume of the session. Pull with the elastic band only for SL and DO, while pull and elastic for BREAST and FLY.

Differences between males and females

In general we can remember that:

Males are stronger than females by nature

Males are more anaerobic than females by nature

Both of these assumptions are best suited for the upper body

Females are naturally (and relatively) more aerobic than males

Females have a recovery capacity after high intensity exercises, higher than that of males (probably thanks to the lower intake of anaerobic mechanisms)

JUST A STATISTICS

What % improvement can I reasonably expect/predict for athletes from age of 11 to competitive maturation.

These improvements will result from improved skills, increased volume and experience in training, attention to detail, experience in racing, simple psychophysical maturation.

age	After 1 year % improv.	+2	+3	+4	+5
11	9.19	6.49	4.34	2.73	2.35
12	6.49	4.34	2.73	2.35	2.10
13	4.34	2.73	2.35	2.10	1.66
14	2.73	2.35	2.10	1.66	1.00
15	2.35	2.10	1.66	1.00	1.00
16	2.10	1.66	1.00	1.00	1.00
17	1.66	1.00	1.00	1.00	0.00

M

age	After 1 year	+2	+3	+4	+5
11	7.06	5.19	2.51	1.18	1.05
12	5.19	2.51	1.18	1.05	0.50
13	2.51	1.18	1.05	0.50	0.50
14	1.18	1.05	0.50	0.50	0.50
15	1.05	0.50	0.50	0.50	0.50
16	0.50	0.50	0.50	0.50	0.00
17	0.50	0.50	0.50	0.00	0.00

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