HIGH LEVEL SWIMMERS
“STAGES OF PREPARATION”

From “fundamental” to “Training to Win”.

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Scientific research has concluded that it takes eight to twelve years of training for a talented player / athlete to reach elite levels. This is known as the "rule of ten years or 10,000 hours of practice", (Ericsson, et al, 1993; Ericsson y Charness de 1994, Bloom, 1985; Salmela et al, 1998)

"It takes 10 years of extensive training to excel in anything"

*Herbert Simon - Nobel Laureate*

**THE ROAD TO EXCELLENCE**

Studies conducted in the USA between 1984 and 1998 concluded that the average of their dedication to training Olympic athletes is 12 years for men and 11.5 in women.
A LONG-TERM PROCESS

Sports can generally be classified as early specialization or late specialization. Early specialization refers to the fact that some sports such as diving, figure skating, gymnastics, rhythmic gymnastics require a specific expertise in early training to achieve excellence in those sports.

- Late specialization sports, such as swimming, combat sports, cycling, racquet sports, rowing, ... require a very general approach during the initial training.

- For these sports, the emphasis during the first two phases of training must be in the general motor development and technical and tactical skills. Early specialization sports require a four-phase model, while late specialization sports require a six-stage model.
These models are generic and should be adjusted specifically for each sport. Each early specialization sport should develop a specific model of the sport itself. A generic model would lead to severe simplifications. The challenge for early specialization sport is finding a way to combine and step well the "fundamental" and "Learning to Train" periods, or amalgamate in a single step.

For late specialization sports, specialization is not recommended before the age of ten, because it contributes to the early exhaustion athlete, abandonment, and removal from training and competition.
EARLY SPECIALIZATION

1. Training to train
2. Training to compete
3. Training to win
4. Retired

LATE SPECIALIZATION

1. Fundamental
2. Learning to train
3. Training to train
4. Training to compete
5. Training to win
6. Retired
"The success tree" B. Sweetenham 2012

www.billsweetenham.com
¿WHEN?

At which point we should ask to start at preparing a young swimmer for good training to the elite.

¿WHY?

What technical, physiological, psychological, training reasons,... give us the right time to make the decision of when.

¿HOW?

That way we plan and develop this process of preparation.
REQUIREMENTS OF AGE GROUP PROGRAM

¿ Do We respect and take advantage of the different training periods based on their Physical and Biological Development?

¿ Do We propose, control and got training goals?

¿ Are our results competitive goal or preparation goals?

¿ Does our trainings programs allow the necessary progression in these categories?

¿ Does our swimmers get the "coming of age" with "excess" training, or "fault" of it?

¿ Do we have young swimmers (16-18 years) in leading positions in international age groups rankings & seniors rankings?
TO CONSIDER IN AGE GROUPS PROGRAMS

- Knowledge of physiology in adults does not guarantee a correct application of loads in young children.

- The processes of maturation and growth is a complex process that we take into account when determining the training plan we want to apply.

- Although their trainability varies according to their biological and physical condition, the contents of their training are not very different from those of adults.

- The design of tasks and especially when we apply are the keys for successful implementation.

- There should be a steady progression in our training plan. Do not give our swimmers all our 'Toolbox' once. If training does not progress the athlete either will progress.
KEY FACTORS IN THE AGE GROUPS TRAINING

To respect and take advantage of the sensitive stages of our swimmers is necessary to implement the essential loads for training:

**PMCV:** “Peak motor coordination”:
- Technical development, aerobic efficiency
- Boys: 9-11 years old
- Girls: before 10-11 years old

**PHV:** “Peak maximum growth”:
- Emphasis on aerobic development
- Boys: 12-15 years old
- Girls: 11-14 years old

**PSV:** “Maximum peak for force development”:
- Emphasis on the strength development
- Boys: 15-17 (12 month later PHV)
- Girls: 12-14, (when menarche start)
Our success in training future Olympic swimmers in our national programs, depends on Clubs and swimmers that form in them.

In the baggage on **technical mastery and resistance work** with younger swimmers, all coaches involved in the training process are important.
### MÁSCULINO

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PHASE I: FUNDAMENTAL.
Girls 5-8 – Boys 6-9

The development of a physical alphabet, consisting of a wide range of movements and technical skills of the sport is essential at this early stage: Agility, balance, coordination, speed, jumping, running, throw, float, catch, kick.

To achieve this literacy is recommended practice various sports.

Learning specific technical skills & Drills: 5 strokes, Start & turns.

Development of physical aspects through play.
Mastery of the body inside and out of the water.
PHASE II : LEARNING TO TRAIN
Girls 8-11 – Boys 9-12

Consistent development of all technical swimming skills through continued repetition of the stimulus, a low intensity and focus on the technical gesture (Volume)

Progression in the intensity and volume of exercise when the gesture is acquired and to check their assimilation.

Development of physical properties through the game in and off the water..

Teaching strength work with own weight: core, pull-ups, chin-ups, planks, jumps, and use .. Material: Swiss balls, medicine ball, dumbbells,

Learning flexibility routines.
Multisport program: Run ,Bike ,climb, Canoeing, Triathlon,…..

Teaching basic practical skills: understanding the stopwatch, control the distance of the tasks, order in the lane, ...

Teaching swimmer Lifestyle."Invisible training"
TRAINING SWIMMING AGE GROUPS.
*(Training to train – Training to Compete)*

“Should be given speed and endurance, to the technical. We can not give Technical, to speed and endurance”.

Medals at international level are not achieved with a poor level of technical skills and drills

Swimmers age groups must achieve a "big box Tools" in terms of technique and skills, which must carry with them throughout their training to the elite, and it will help them to adapt, improve and yield up to the senior age.

The development of a physical alphabet, consisting of a wide range of movements and technical skills of the sport, it is essential from the first stage: agility, balance, coordination, speed, jump, run, throw, float, catch, kick. “FIRST CREATE ATHLETES, LATER CREATE SWIMMERS”

In forming the age group swimmer, we not only have to train them, especially we need also to EDUCATE. (Coaching Vs Training).
TRAINING SWIMMING AGE GROUPS

Everything is not just physical or mental, is also SENTIMENTAL (love what you do)."

To become an Olympic swimmer is a process in time. The start at the right time this process, is largely based on the success.

This period begins with 11-12 girls and 12-13 in boys and extends to 16-17 Years in girls until 18-19 years in boys. These limits may vary depending on different ranges of maturation.

Training volume is a determining factor in the improvements in the medium and long term. The quality of training is based on the ability to maintain efficiency and effectiveness in progressively higher loads.

During This period the aim is the progressive increase in training volume

Fast age group swimming is important, navy, vital to a healthy Spanish Swim team......But we must to know how to do this process
TRAINING SWIMMING AGE GROUPS

This process of successful training is directly related to the onset of the progressive increase in volume and the time spent at work during that time period.

In this way towards maturation, is more important "quantity" than "quality", understanding quality ratio, as anaerobic work.

The skill and the ability to adapt and assimilate training, largely acquired during this training.

Training volume reached during this phase will be basically the volume of base throughout his career.

From 17-18 years, the program has managed to keep the volume and proportionally increase the quality and specificity.

Prioritize work speed (50-100mts) before maturity, causes a physiological demand difficult to reach and grasp.
TRAINING SWIMMING AGE GROUPS

Use "Reverse periodization" is only useful in senior swimmers (post ripening) in 50-100mts tests, and with a background of at least 10 years of training. It is not advisable nor beneficial in age group swimmers. Its benefit to prepare 200mts event depend largely in talent swimmer, and is not suitable for the preparation of test 400mts.

We should not overexpose immature athletes at “competitive” great demands beyond their maturity level work. "Too much too often”

We must avoid premature specialization, both, distances and styles

Age Group Swimmers should "specialize" in the 200 m. and 400 m. distance evetns , and 4 strokes

The 200 m events ,should be a priority for all swimmers ages.
**WHY WE TRAIN FOR 200 – 400 MTS EVENTS**

- Swimming 200/400 events at age groups, later, during their specialization, age groups swimmers can go "up or down" distance, depending on its future development, to achieve success in both directions.

- These events require a good balance in the development and preparation of all energy systems.

- By preparing for these will will educate the swimmer to identify the different ranges of heart rate aerobic / anaerobic work, different swimming speeds (FS, LS) and the different technical skills: Underwater, tursn, starts, finshi, pace, …
WHY WE TRAIN FOR 200 – 400 MTS EVENTS

- This domain and control of the technical skills of all strokes, should be part of your "toolkit".

- Training for these events, allow us to compete in various lengths and styles. This will allow the swimmer looking for a later specialization determined by physical, physiological and technical characteristics.

- It is difficult to guess whether late maturing swimmers evolve into middle distance or speed characteristics. Working this way prepare the swimmer to choose the most profitable option athletically, with guaranteed success when you get your physical development. "No mortgaged their future."
PORCENTAJES AERÓBICO – ANAERÓBICO EN CUANTO A LA DURACIÓN DEL ESFUERZO

<table>
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<tr>
<th>contribución de energía</th>
<th>0-10 ss</th>
<th>0-15 s</th>
<th>0-20 s</th>
<th>0-30 s</th>
<th>0-45 s</th>
<th>0-60 s</th>
<th>0-75 s</th>
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<tr>
<td>% Aerobica</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>27</td>
<td>37</td>
<td>45</td>
<td>51</td>
<td>56</td>
<td>63</td>
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<td>79</td>
</tr>
<tr>
<td>% Anaerobica</td>
<td>94</td>
<td>88</td>
<td>82</td>
<td>73</td>
<td>63</td>
<td>55</td>
<td>48</td>
<td>44</td>
<td>37</td>
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EVOLUCIÓN DEL VO2MAX EN LAS PRUEBAS DE 200-400 MTS

Consumo de oxígeno (ml/kg/min)

10 20 30 40 50 60 70 80 90 100 110

Tiempo (s)

Déficit de oxígeno
Consumo de oxígeno

VO₂pico

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240

Tiempo (s)
### SISTEMAS ENERGÉTICOS SEGÚN LA DISTANCIA DE PRUEBA (RODRÍGUEZ & MADER 2010).

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<th>Distance</th>
<th>Time min:s</th>
<th>ATP-PCr (%)</th>
<th>Glycolysis (%)</th>
<th>Aerobic (%)</th>
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<td>50 m</td>
<td>0:22.0</td>
<td>38</td>
<td>58</td>
<td>4</td>
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<tr>
<td>100 m</td>
<td>0:48.0</td>
<td>20</td>
<td>39</td>
<td>41</td>
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<tr>
<td>200 m</td>
<td>1:45.0</td>
<td>13</td>
<td>29</td>
<td>58</td>
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<td>400 m</td>
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<tr>
<td>800 m</td>
<td>7:50.0</td>
<td>4</td>
<td>14</td>
<td>82</td>
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<tr>
<td>1.500 m</td>
<td>14:50.0</td>
<td>3</td>
<td>11</td>
<td>86</td>
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Reference times for top-level male crawl swimmers (2008). The relative energy patterns in female swimmers are assumed to be relatively similar for a given distance.
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<tr>
<th>ZONA</th>
<th>CLASIFICACIÓN</th>
<th>DESCRIPCIÓN</th>
<th>FC (PBM)</th>
<th>SIMPLIFICADA</th>
<th>Sweetenham Atkinson</th>
<th>Maglischo</th>
<th>Olbrecht</th>
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<td>A1</td>
<td>Aeróbico Baja Intensidad</td>
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<td>Aeróbico</td>
<td>Zona 1</td>
<td>EN1</td>
<td>AEC</td>
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<td>A2</td>
<td>Aeróbico Mantenimiento</td>
<td>40-50</td>
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<td>A2</td>
<td>AEC</td>
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<td>Umbral Anaeróbico</td>
<td>30-40</td>
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<td>Sobrecarga Aeróbica</td>
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<td>Ritmo de prueba</td>
<td>MVO₂</td>
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<td>Sprint</td>
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**ZONAS DE ENTRENAMIENTO**
THE TRAINING PROGRAM I

✔ The program should take 44-50 weeks / year.

✔ Continuity of work is an essential factor in the formative stages. Avoid long training pauses, including dates and periods indicated (Christmas, Easter, Summer,..): 44x50 = 2200 vs 47x46 = 2200 ; 45x55=2500 vs 48x52 = 2500 V.

✔ Two Macro cycles 23-25 weeks, or three of 16 weeks. Kind of programs : Traditional & Contemporary, "4 weeks cycle“

✔ 85-90% of the scheduled job should be to improve the capacity and aerobic fitness throughout their range. From the aerobic 40bbm, "we get bored before we dropped down” to the most intense, 20-10bbm,"we get tired before we bored”.

✔ Improving aerobic capacity t has to be linked to the improvement of efficiency and technical efficiency. Aerobic development is "the ability to go further, faster and with less effort" (John Leonard)
THE TRAINING PROGRAM II

✓ All aerobic work should be carried out in uniform swim or negative.

✓ Working TH & Vo2max work, towards race pace of 200-400-800, where we check the speed, heart rate and will be also essential to control the FS, LS (stroke count)

✓ Race pace Sets, always mixed with aerobic work

✓ The anaerobic work is not contraindicated, but your percentage will depend on the total percentage of work. It is very important to find this balance, but the percentage of this type of work will range from 5-10% of the total.

✓ The improvement in the density of aerobic work is another of the goals of aerobic improvement through the reduction of rest and increased volume:
  20x100 c/1‘30 (2000/30´) – 20x100 c/1´25 (2000/28´20) - 20x100 c/1´20 (2000/26´40)
This is an example of the density of aerobic work optimal adaptation is:
  40´-45´/30-40bbm:3000mts  60´-70´/30-40bbm:4500mts
THE TRAINING PROGRAM III

✓ The improvement in the basic aerobic speed swimming (2-3mml) is essential. A good way to test field, to control rates of aerobic training, aerobic efficiency and cardiac adaptation, improving our basic aerobic pace, it is 3km event. Will be held every approximately every 7-8 weeks.

✓ Control of aerobic workout so take by controlling the heart rate it will therefore be necessary to know the maximum pulse of all our swimmers.

✓ Regarding the speed work, their percentage of the program is approx. 5%. This percentage rate will depend on the total volume of program. But it’s necessary!!!

✓ The speed work may include work from Race Speed ("Speed Charts"), to the work of "specific power" and / or assisted / resisted speed.
THE TRAINING PROGRAM IV

✓ For introducing tolerance lactate work we usually use the training to improve 2nd split of the 100mts event.

✓ Pay special attention to the work of technical skills in speed: stars, turns, and finish. "Our level of these skills depend on our practice, not our genetics." For this we exploit “the sensitivity of the motor learning time” to develop them to the fullest.

✓ Technical efficiency in the speed work will also be essential:

  a) Check the number of strokes or kicks in 20-25-30 m. (check the time)

  b) Check the distance in a limit time: 20-25sgs (Check number of strokes).

  c) Check the time & meters in 7-8 strokes (check FS).
THE TRAINING PROGRAM V.

It is a common mistake to rely too much or too little in resistance work and / or for sprint work.

Younger athletes often need to swim longer distances than the competition, it helps to improve the work of threshold. But they must also swim sprints with controlled distances from the series. A program of age group swimmers will thrive when you have both situations in the appropriate weekly rate. Planning with just one of these tasks will limit our athletes during the season, and overall training.
AEROBIC SETS.

4 x 800 C c/10 ’20 [40-30]
3 x (100+200+300+400) c/1’15 (30)
4 x (4x100 c/1 ’20 (30bbm) +1 x 400 (20-25bbm)

AEROBIC-ANAEROBIC SETS

12 x 300 c/4.00 2 (40-30) -1 (20)
15 x 200 c/2’50-3’-3’10 [40-30-20]
20 x 150 (5-4-3-2-1) c/2’20-2’30-2’40-2’50 (30-40)----- (30-20-10)
30 x 100 15-10-5 (25bbm-----10bbm) R1500-R800-R400

4 x (300 c/4’15 (30) – 200 c/3’10 (20)-300 c/4’15 (30) -100 (15)
8 x (1x400 (30) +1 x 100 (20-10))
ANAERÓBIC SETS – Race Pace

3 x 12 x 50 3r400- 1 rn200 / 2r400-2r200 / all r200
4 x 200 Broken (1ª 4x50, 2ª 2x50 +1 x 100, 3ª 1 x 50+1 x 100+1 x 50, 4ª 2 x 100)
16 x (1x150 + 1x50 r200)

COMPLEX SETS

3 x (1 x 100 r(1)400 c/2' – 3 x 400/3x300/3x200 - 2 x 50 EPr200c/1’
3 x (2x50 r(1)200 c/1'30 – 8/6/4x 100 r1500-800-400 -2x50 EP r(2)200 C/1’15
3 x (2x50 r200 + 4x200 build 1 to 3 – 4x50 r200)
2 x (2x50r2 + 2x200 AE + 4x50R2+ 2x150AE +2x75 R2+ 1x200AE +1x100R2)
THE PULL & KICK PROGRAM

The PULL work must be provided with “band”, and with or without pull, with or without paddles. It is necessary to register this work and the improvement of resisted sets, checking time, strokes, distance.

The phasing of work "specific power - specific speed", with exquisite technical quality should be taken into account for optimization at later stages. (50-100 m events)

The Pull work must be done in all strokes, in all its varieties and different distances and speeds (100-200-400-1500 speed)

Working with band & pull, should be and important part of the work of “specific resistance”, and therefore its demand is imperative, technically and physically

About the kick work, should be demanding, controlled and quantified. To swim “social kick" ...... Will be better take a walk.!!!!!!!. All kick work must be hard and as fast as possible.
THE PULL & KICK PROGRAM.

The volume of kick work should represent approximately 20-25% of the total work. At least 5-10% must be programmed into the energy systems that we want to improve (fins), and the other 15% must be at least 90% of our best specific performance of legs.

You will need to know the best performance of our swimmers in pool 50 mts in the following distances:

25-50 underwater, 75-100 -150-200-300 -400 kick

The kick work has to be a constant challenge for our athletes.

An age group swimmer that improves his level of kicking, can achieve great performance benefits.

Try to use kick training at the end of the session as a challenge to improve the level and exercise capacity.
DRY-LAND PROGRAM.

You have to be "generous" in dry-land work

Achieving a perfect fitness shape, whether for work 'gymnastics', and through other similar sports (same energy systems and similar technical gestures), is necessary. "Physical literacy" create Athletes

Domain “auto loads” work. Chins, Core, Diving, ... "Relative Strength" Do we know how many Chin-ups our swimmers do? How many swimmers as 14 years get make 10? We get an annual progression here too?. How tall are our “Abalakov jump”? . We improve as we need?

When swimmers are physically well trained, these guarantees them to have a long career without injury.
DRY-LAND PROGRAM.

Dry-Land training is a good alternative as for aerobic work, as for the "endurance" work, in that programs on for various reasons can not cover the time in pool for developing these physical adaptations.

From 10-11 years the strength and conditioning program must be present forever in our programs, either "Working Fitness", or as in later ages to "Strength routines".

Keep in mind that the work routines (weights) should be considered as a "medicine." If I do not need I do not use (I get only cause fatigue).

Probably your need and assimilation is determined by genetics swimmer, but the improvement in this regard is important at all levels, especially in girls.
DRY-LAND PROGRAM.

Take advantage of the sensitive moments for introduction.

We must constantly observe check, analyze and progress. Knowing that strength that our swimmers need to identify, in what quantity, and under what methodological system.

It should be used essentially four objectives:

1. To improve distance per stroke and time per stroke
2. To improve our speed
3. To improve our “maintenance of speed”
4. To improve and control our body position
TECHNICAL PROGRAM.

Body Position in the water: head, shoulders, hips, legs, ankles.

“Streamline”.

4 strokes technically

Drills: Starts, turns, finish, relay start

Underwater swimming
TECHNICAL PROGRAM.

**BREASTROKE:** Feet turned when the kick start (plant your feet back). Not open knees to the push (more closed than the feet). Start stroke out just after finishing kick, with chin-down head inside. Heels together at the end with separate hands. High hip.

**FREESTYLE:** Continued strong shake kick with splayed legs, ankles attention and toes on the surface. Control of breathing and head position-hip. Control input arm (finger-wrist-elbow-shoulder, not splash in the basket!).

**BUTTERFLY:** Breathing just before the recovery. Feet together to lower the kick (hands input) and kick up (to take your hands). Continuous arms at the same time (not stop!) In the stroke. Broad stroke, head down to the start of the stroke, and high hip, elbow high before pulling.

**BACKSTROKE:** High hip. Continuous movement of arms, straight and high recovery, hands touching the ear entrance. Shake continuous legs, knees underwater and legs extended. Attention to the ankles, toes on the surface.
Two main sessions a week of "demanding" aerobic workout, gradually raising aerobic tasks increasingly "difficult".

Two more sessions of Steady aerobic. Check heart rate, count strokes, time.

The Aerobic work during the season, during the week, and during training sets, provided from AEM to TH progressive, From easier to more difficult, From less volume to more volume (more distance, less rest, same speed, perfect quality technical).

All proposed work (aerobic, speed, pace, ...) with maximum technical quality: stroke count, turns, underwater, finish, ...

Always check: time, Heart rate, and count strokes.
The Main sets progress, from TH to Vo2max, and Later to 1500, 800, 400 race pace. These evolution is in order to the number of sets, rest, speeds.

The "steady Aerobic", ICS, always must be registered: time, Count strokes and Heart rate. Check the efficiency.

High quality technical (turns, underwater, finishes) and tactical (swim uniform or negative) in all tasks.

Every week is progress from the previous. Tasks always from shorter to longer, more rest to less rest, and slower to faster.
Sets for 100’s race speed, are based on “Speed Charts”.

Sets of VO2max & HIT starting on VO2max and progressing to 800-400-200 race pace.

Increased volume of work rate of 200-400, using Complex sets, without neglecting or losing technical quality.

We continue to insist on the technical (turns, under water, finishes) and tactical quality (negative splits) for all tasks.
“NEVER TALK TO MY PLAYERS ABOUT WIN; WINNING IS THE DIRECT RESULT OF TO BE PREPARED” (J. Wooden)