World Swimming Coaches Association

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"Whatever you do in life, surround yourself with smart people who'll argue with you." --John Wooden

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Guest Speaker, Coach Chris Morgan

Chris Morgan graduated from the University of California, Davis with a B.S. in Biological Sciences in 1993. Chris went on to coach at Stanford University under the legendary swim coach Richard Quick.

In 1997, Chris took a "leap of faith" and moved to Switzerland. He eventually earned a spot as a National team coach and 2008 Swiss Olympic coach. Receiving an M.S. in sports science and human movement.

Chris returned to the United States in 2012 and took an assistant coaching position at Harvard University. This is when the KAATSU journey began. Chris met KAATSU founder Steven Munatones while Steve was working with the Harvard men's team.

Over the last 8 years Chris has become the world's foremost expert on how to implement KAATSU AQUA into all aspects (recovery, rehabilitation, and recovery) of aquatic activities. Chris also serves on the WOWSA Board of Directors.

https://www.kaatsublog.com/2016/10/olympic-swim-coach-on-his-use-of-kaatsu.html

WSCA COACH WEBCASTS

April 15th, 2021•16:00 GMT–10:00 AM CT
Q&A Live on Zoom

From Learn-to-Swim to the Olympic Podium.
How to take your club from beginners to Olympic medalists.

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Low-Volume/High-Intensity Training

Reduced training at a higher intensity may look like a better, faster way to success, but the answer is not that simple.

by James E. Counsilman, Ph.D. and Brian E. Counsilman, M.S.

(Reproduced from Swimming Technique Magazine, February-April 1990)

At the recent American Swimming Coaches Association World Clinic in Pittsburgh, we talked with many coaches, including national team director Dennis Pursley, Mark Schubert, Lars Jorgenson, Dick Shoulberg, Randy Reese, Nort Thornton, Richard Quick, George Haines, Peter Daland, and others. **They all expressed alarm at the continued publication of articles, which advocate a reduction in training volume for swimmers and claim to produce faster times through a combination of low volume with high intensity. We think we are at a crisis point within the swimming community on account of these articles.** Coaches who have had a lot of success with proven methods have become fearful of the effect of these articles, mostly on **impressionable young coaches**. The latter **would like nothing better than to use these simplistic methods and produce world champions.**

Low volume and high intensity are relative terms susceptible to broad interpretation. For this discussion, **low volume is 4,000 meters per day**, compared to an average distance per day of national qualifiers of 12,000 meters. **High intensity is efforts that are above the anaerobic threshold.**

The contention of less-yardage proponents is this: A swimmer can get in shape better by training at sprint or high-intensity levels over less yardage than by training conventionally in an integrated program. **The conventional or integrated programs combine the various methods of over-distance, interval training, sprint training into a workout schedule that varies widely and progressively throughout a season, a year, or any given period, even including the swimmer's entire career.**

First, it seems necessary to point out that **the low-volume, high-intensity program is not new**, far from it. **It has been tried in the past by many coaches and swimmers**, going back as far as Johnny Weissmuller. We have tried it, as have our friends Brent Rushall and Jim Montrella, to name a couple that we know of personally. **Most of us abandoned it after a season or two** of experimentation. Why? **Because we got poor results.**

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On the other hand, some coaches have reported favorable results, among them Don Watkinds[1]. Several teams in the Midwest, whose coaches we know personally, have also adopted the program. They report **good results early in the season, particularly in the short distances, but their times have not dropped significantly at the end of the season. On average, their distance swimmers showed a decrease in performance from the beginning of the season onward.**

The use of an integrated program, especially aerobic work, referred to as over-distance and interval training, prepares what many coaches refer to as a base upon which more intense work can be superimposed. **The low-volume/high-intensity method is an attractive concept. It would mean far fewer hours spent at the pool and far less volume in the water if it was effective.**

In one recent paper, a proponent of this method noted that Vladimir Salnikov, the great Russian Olympic champion and world record holder in the 1500-meter event, had adopted the low-yardage/high-intensity program. Salnikov tried this type of training, leaving his traditional coach and announcing that he intended to train only 20-30 minutes a day. He said his wife would be his coach. He proceeded to (figuratively) stink up the pool. After repeated failures, he returned to conventional training methods and went on to win the gold medal in the 1500-meter event at Seoul in 1988. Recently, Salnikov was appointed national coach for the USSR. He stated that many Russian swimmers were lazy and would have to stop looking for shortcuts and get back to hard work if they expected to reach world-class levels. **He ended his career with the same conclusion that many of us have also reached: there are no shortcuts to good swimming conditioning, particularly for distance events.**

The Training Program of Vladimir Salnikov
Attack Mesocycle – Week One
(all distances in meters)

Monday A.M.
1. 2000 free, alternate (1500 free/500 free), rest 15 secs.
2. 5 x 200, odd numbers IM easy, even number free with donut, paddles, FAST
3. 3 x 1000 free, progressive, rest 20 secs.
4. 3 x 300 IM on chest, on back, over 50 m, EASY plus 200 kick, free, in four positions.
5. 3 x 500 free, interval training, rest 25 secs.
6. 5 x 200 easy, odd numbers on back, even numbers IM kick
7. 50 free, for time, from push-off

TOTAL: 10 km

Monday P.M.
1. 8 x 600 free, rest 15 secs. (Odd number stretch on 25 strokes, paddles, even numbers stretch on 30 strokes without paddles)
2. 300, 2 exercises free, paddles, middle tempo
3. 800 free, rubber, resistance 17 kg.
4. 600 IM on chest, on back over 50 m, EASY
5. 16 x 50 free, sprint on 50 secs.
6. 700 other strokes (backstroke) EASY
7. 5 x 400 free, pull, kick, paddles, pull-buoys, tubes or drag suits, FAST, odd numbers pull, even numbers kick.

TOTAL: 10 km

Table 1

Table 1 is a single day's sample workout in Salnikov's regimen, as presented by his coach, Igor Koshkin, at a clinic in Australia in 1986[2]. It is a typical integrated workout, which illustrates how **a premier distance swimmer uses little sprint training. Most work is done aerobically on or near the anaerobic threshold level.** On this day, he trained a total of 20,000 meters. These workouts occurred on the first day of his "attack mesocycle," which is the most arduous training cycle. **Such workouts are not used at all by sprinters or middle-distance swimmers.**

In the opinion of the majority of successful coaches, **it is far better for swimmers to base their programs on concepts that have stood the test of time rather than to adopt unproven methods and suggestions, which could have emerged from a misinterpretation of the principles and research that supports them.** We believe that is the phenomenon with which we are dealing now. We base that belief on the fact that the same principles are cited as evidence to reinforce the low-volume/high-intensity concept, as I have used to support quite different claims.

Bias affects most people's judgment. All of us tend to justify our particular position via the rationalization process. We find it next to impossible to remain objective. We tend to present only the information which substantiates our beliefs, and we dismiss, misinterpret, or denigrate the data that disagrees with our position. This bias is the primary reason that disputes such as the one confronting us now have arisen in the competitive swimming community.

To combat that tendency, we propose to examine the controversial methods in terms of the following criteria: how the champions and elite swimmers train and whether or not the low-volume/high-intensity method conforms to commonly accepted principles of training. (For this study, elite swimmers had either achieved the NCAA Division I qualifying time standard or the Olympic Trials qualifying time standard.) **Many of the champion American swimmers and/or their coaches were interviewed at the 1987 USS Long Course Nationals concerning their training regimens. Following is a list of the average distance swum per day, plus the number of workouts per week at the height of the training season:**

Number of workouts/week 10.2 avg.
Two workouts/day 12,064 avg. meters
One workout/day 7,882 avg. meters

Peter Daland and Ernie Maglischo[3] conducted a similar study during the European Championships in Strasbourg in 1987. The results were much like those of the 1987 U.S. Championships. In neither championship event did a single swimmer use the low-volume/high-intensity type of training.

Elite swimmers are using the methods supported by the training principles in the next section of this paper. **Those who advocate low-volume/high-intensity workouts have resorted to two tactics to support their claims. First, that the bulk of exercise physiology research reinforces their position. Second, that the three universally accepted principles of specificity, overload, and reversibility support the concept of low-volume/high-intensity training.**

There is a real problem with the first claim. There is such an enormous body of research from which to choose that a person can find information to support his claim and ignore what refutes it. The second tactic's success stems from the person's selective interpretation and/or misinterpretation of the three training principles. The principle of specificity, which states that adaptation is specific to the stress applied, is being interpreted by such writers to mean that all training should be competition-specific, at race intensity. The overload principle is interpreted to indicate that training intensity is the only assuring (contributing) factor to overload. These writers interpret the principle of reversibility to mean that no residual effect exists; that is, that maintenance and rate of detraining and retraining are the same among all athletes regardless of previous training background.

The Principle of Specificity

Sports training scientists and coaches realized that the principles of specificity, overload, and reversibility are often misinterpreted. They deemed it necessary to develop secondary principles that would clarify the conceptual foundation of sports training. Such attempts produced the principle of gradual, systematic training, the principle of uniting general and specialized training, the principle of maximal loading, and so on. Thus, **the principle of specificity is more clearly defined by the principle of complexity of training.**

The landmark study of Viru, Urgenstein, Pisuke (1972)[4] demonstrated that one type of training method or exercise does not have a maximal effect on one, or, at most, a few physiological parameters. The Viru study also determined that a training method or exercise may also have a negative effect. As a result of this study, which greatly influenced Soviet sports training regimens, it was determined that **for training to have a maximal impact on all functions, a complex regimen, utilizing the proper and systematic dosage of all training methods must be constructed. The dosage and distribution of each method or exercise throughout long-term training depends on the different rates of adaptation of each of the leading functions.** Volkov[5] explained these different rates of adaptation, defined as the heterochronicity of training:

"The adaptive changes connected with aerobic capacity take place slowly and require an extended training plan. Adaptation in the synthesis of specific proteins, which provide high muscle contractility capability, is just as slow. When developed as a result of training, these changes maintain at a given level for an extended time.

"Biochemical changes associated with the glycolytic anaerobic process develop much faster under the influence of physical loads. **But they are lost just as fast after cessation of training.** This peculiar feature of biochemical adaptation to physical loads should be studied both from the standpoint of the dosage of training loads and its distribution throughout the different stages of training."

The principle of complexity provides a more complete explanation of the principle of specificity, which is that the adaptations taking place are specific to the nature of the training or exercise used, and not that all training should be competitive-specific. Numerous studies show that sprint training has decidedly different training effects than endurance training. These studies do not lend support to the idea that sprinters should only sprint.

By the definition of specificity, the nature of anaerobic training loads would indicate that they enhance anaerobic performance, but increased anaerobic performance alone has limited benefits. **A swimmer who specializes in the 50 and 100-meter freestyles needs not only high anaerobic capacity but also a high anaerobic threshold to delay the onset of blood lactate accumulation during a competitive performance.**

Endurance training has a maximal training effect of decreasing blood lactate accumulation during exercise, thereby raising the anaerobic threshold[6]. Sprint training has a minimal training effect on reducing blood lactate accumulation during submaximal exercise. It follows, therefore, that a balanced program of both endurance and sprint training is required for the holistic development of competitive performance. According to Harre[7], endurance training is best realized through the use of high-volume/low-intensity training, while strength and speed are better trained through the use of low-volume/high-intensity training. This seems to be the consensus.

The Principle of Overload

From the outset, we should understand that much of the controversy discussed here stems from terminology confusion. Overtraining, as coaches and sports training scientists use it to describe the overload principle's progressive process, is beneficial and even desirable. The problem arises when the same term is also employed to describe intensity and duration of work to the point of failing adaptation or exhaustion, or, which makes it even more confusing, to

represent a point beyond which training is useful. Any attempt to discuss the subject rationally tends to get mired in the terminology. For this paper, we propose to offer the following terms:

1. **Overtraining will mean the careful process of manipulation of intensity and duration to the end that successful adaptation repeatedly occurs during any given training period (season, year, or career).**

2. **Overwork will describe a point beyond which no manipulation of volume will improve performance.**

3. **Stagnation (or maintenance) will refer to a point at which performance reaches a plateau beyond which it cannot progress without manipulating either intensity or volume.**

4. **Staleness will describe failing adaptation.**

This term is not a perfect choice since staleness comprises other factors, both psychological and physical. The fact that there is no more precise term gives some idea of the complexity of the issues. That is because failing adaptation can be precipitated by such factors as lack of proper rest, inadequate diet, stresses in the athlete's environment, or improper manipulation of the intensity/volume aspects.

According to the more popular exercise physiology texts, exercise intensity is probably the most significant factor for overload. The term "intensity" is used by both exercise physiologists and sports training scientists to explain energy expenditure changes over the aerobic/anaerobic continuum. In sports training rhetoric, the first two zones of the five zones of intensity are the aerobic zones. Zone 1 refers to compensatory efforts or very low intensity aerobic (that is, warm-up, loosen-down, easy swimming, and so on) and zone 2 to aerobic efforts below the anaerobic threshold (that is, high-intensity aerobic). Even higher intensity exercise goes beyond aerobic effort to describe anaerobic threshold and anaerobic glycolytic and anaerobic alactate work. Remember that **we can misinterpret intensity when distinctions between high-intensity aerobic and anaerobic efforts are needed** (see Table 2).

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Stages of Relative Training Intensity

Stage	Type of work	Sources of energy	Pulse rate	Lactate (mmol/L)
1	Easy swimming	Aerobic	120-140	20
2	General endurance (first level)	Aerobic	140-160	2.0-4.5
3	General endurance (second level)	Aerobic/ Anaerobic	160-180	9.0
4	Specific competitive work	Anaerobic (lactate)	Max (210)	Max (22.0)
5	Sprinting	Anaerobic	—	—

Table 2.

In sports training, the proper application of the overload principle of training is progressive increases in the training load. To ensure that training will steadily improve, coaches must carefully manipulate not only intensity but also the duration and frequency of training.

In the study of the dynamics of the training load, coaches and researchers assumed that if the training intensity is high, the duration of training is low within each training session. The continued use of high-intensity training, it is reasoned, must include continued short durations of training. The exclusive use of high-intensity training was addressed in the so-called East German principle of repetition, also known as the Soviet principle of maximal loads. It states that, **after a certain amount of intensive training, athletes reach a performance plateau for strength, speed, and endurance, and technique of various motion patterns. A further performance improvement is only possible through more repetitions (volume stimulus) either in the form of more days of training per week or more repetitions per day or by shorter breaks between repetitions (density stimulus). These changes in loading factors lead to a progressive increase in the total workload and to an improvement in conditioning.**

Further elaboration on the principle of repetition by Volkov (1974)[8], Taylor (1975)[9], Harre (1982)[10], and Bompa (1983) [11] noted that **a training load that remains unchanged and produces physiological changes early in the season would not produce further changes later on (stagnation).** Therefore, if each successive training session's content remains the same throughout the season, continual performance improvements will not occur. **In low-volume/high-intensity training, how does the content of each workout change to ensure increased training stimulus?**

The writers who advocate this type of training have given us nothing but sample workouts and have offered little insight or suggestions about long-term planning. **How exactly does low-volume/high-intensity training change in content season by season, year by year? Can continued adaptation be expected from workouts that remain 3,000-4,000 yards or meters per day throughout an athlete's career? The best outcome would be training maintenance.**

Suppose the principle of progressive increase in training load is understood. Do **low-volume/high-intensity training advocates believe intensity is the only variable that changes when increasing training stimulus? The result would be a chronic and excessive use of maximal loads, leading to failing adaptation or disruption of training to allow long recovery periods. No matter how you look at it, the only logical outcome would be training stagnation, not improvement.**

The Principle of Reversibility

Exercise physiologists currently contend that maintenance and detraining, and retraining are unaffected by previous sports training. That is, no residual training effect exists. Advocates of low-volume/high-intensity training methods offer this opinion to prove that athletes do not develop long-lasting training effects, often described as a training base. Studies in which subjects training on cycle ergometers, treadmills, or using walking or running programs support this view.

The subjects who participate in these studies are described as trained or untrained. It is here that the genuinely inherent flaws in exercise physiology studies are most apparent. First, the type of exercise and training regimens used in these studies are nonspecific to the sport's physical and neuromuscular demands. The exercise physiology community itself has established that cycle ergometer and treadmill cannot predict the fitness indices of swimmers in swimming (Holmer, 1974)[12]. Second, the subjects typically used in exercise physiology tests are usually non-elite athletes. Even if elite athletes, who have extensive training backgrounds, were compared with untrained subjects, the nonspecific testing protocol would be useless in determining maintenance, detraining, and retraining specific to their sport. Third, exercise physiologists often select a limited number of variables, which may or may not be present. If no changes in these variables' measurements occur, they conclude that no changes have taken place.

The problem is that this procedure ignores the possible changes in the variables they have not measured. **Any significant studies on maintenance and the rate of detraining and retraining must use testing and measuring protocol specific to the sport, make greater use of elite performers as test subjects, and refrain from making sweeping conclusions they lack the**

research capability to support. They must also acknowledge research that refutes their opinions.

In the case of the residual effect of training, there is very little research demonstrating its existence. Yet, it is a phenomenon well known to sports trainers, who believe that increasing technological capacity will prove its existence. Meanwhile, **a good study that suggests its existence is by Coyle, et al[13]. Seven endurance exercise athletes (runners) were studied 12, 21, 56, and 84 days after training cessation. The results demonstrated that endurance exercise training induces an increase in maximal stroke volume and cardiac output, capillarization, and respiratory action of the skeletal muscle. While there was a reduction in the maximum oxygen uptake in the detraining athletes after 84 days of training, the athletes retained a higher maximum oxygen uptake than the sedentary control subjects (50.8 versus 43.3 ml kg- VO2). We consider the next finding to be of great importance: skeletal muscle capillary density did not decline with inactivity, remaining fifty percent above that of the sedentary control.** This is the type of study we need to pursue. It gives credence to the concept that **aerobic training has a significant residual effect**, and it provides an estimate of what those effects are and how long they last.

As mentioned earlier, advocates of low-volume/high-intensity training use the term overtraining to describe what is currently being done by most national-level swimmers. This is a departure from its accepted meaning. They contend that overtraining is the continued use of training beyond any practical benefits. Dudley, et al[14] is cited to confirm this notion. We believe that Dudley's results were misinterpreted, as has the concept of overtraining. Thus, it is here that we choose to substitute the term "overwork" to differentiate between these terms. That will leave inviolate the accepted meaning of the term, which does not include the idea of exercise beyond a theoretical threshold of training benefits.

According to most sports scientists, overtraining may result from chronic flaws in the long-term training process that lead to failing adaptation and a long-term decrease in athletic performance. According to Bompa[15], **these result from prolonged and over-extended use of maximal training stimulus.** Therefore, **the main controlling factor that brings about overwork is usually the intensity of the training stimulus, not the work volume.**

Another training factor that has recently emerged within the controversy of overtraining is the frequency of training. There was considerable discussion on how often a swimmer should train per day. Costill's [16] study on muscle glycogen depletion during interval swim training precipitated this debate.

The advocates of low-volume/high-intensity training have misinterpreted Costill's research to indicate that training twice-a-day will lead to overwork. This error results from the belief that muscle glycogen's complete resynthesis between training sessions is a desirable training effect. However, two primary agents of stress that lead to physiological adaptation are low muscle glycogen levels and high lactate levels. Rather than expecting complete recovery between one training session and the succeeding one, it is considered a desirable effect to superimpose the stress of another training session before the body has completely recovered from the previous one, perhaps as often as twice or three times a week.

Matveyev [17] describes three effects of training: immediate, delayed, and cumulative. The immediate effect of training is a decrease in work capacity or training fatigue. The delayed training effect of the first kind is under-rehabilitation of work capacity, also defined as the after-effects of training. Matveyev contends that **progressive increases in training stimulus should occur in the after-effects of previous training.**

The delayed training effect of the second kind, which is the full restoration of work capacity, might be beneficial on occasion. However, it is not the desired effect in gradual, progressive training. The controlling factor is the frequency of training, or, more specifically, the rest between training sessions. **If there is too much recovery between training sessions, the previous training session's after-effects are lost. Under these conditions, the best possible long-term result would be maintenance, not improvement.**

Nowhere in his article does Costill say that incomplete recovery between two training sessions per day causes overwork. He simply states that the depletion of muscle glycogen and resynthesis rate might indicate work tolerance among athletes. These indicators would indeed be useful but would provide no new insights into long-term training changes. Unfortunately, Costill made the following statement, which is misinterpreted as applying to elite and non-elite swimmers alike: "These data provide a better understanding of the impact of interval training on muscle glycogen reserve, and to the risk of low muscle glycogen when swimmers train twice per day[18]."

This indeed could be true, depending on the level of the swimmers. The subjects in Costill's group were not elite swimmers and perhaps did not have the training residual to tolerate hard training with impunity. We believe that the intelligent application of the principle of progressive overload, in addition to the use of an integrated program, will permit any healthy swimmer to adapt to training twice a day. (As discussed earlier, most swimmers do not train twice-a-day, every day of the week. They do train enough to translate into 9-12 sessions per week.)

It is common knowledge among coaches that athletes of non-elite status and/or in poor training condition at the beginning of the season will indeed go through profound initial decreases in work capacity. **Sub-elite swimmers require more extended periods of rest and recovery than trained, elite swimmers. But, as conditioning improves, the athlete, be he elite or non-elite, will adapt and recover more quickly from the training stimulus and will be capable of increasing the frequency of his training bouts.**

The simplistic notion of increasing intensity with each successive training session would eventually lead to overworking. Any additional training stimulus will have to come from increasing the training frequency if progressive increases in training occur without the overuse of maximal training loads. It is also important to repeat that other factors, such as lack of sleep, poor dietary habits, emotional problems, use of alcohol, illness, and so on, may contribute to additional stress factors that can lead to failing adaptation. Elite athletes are usually more willing to make the necessary sacrifices to eliminate these extraneous stresses than are non-elite swimmers.

Although we have not discussed multi-year training plans, we want to mention that they typically suggest an increase in both the volume and overall intensity (demand) of training. Nevertheless, this does not justify an unstructured use of high anaerobic loads. **Although multi-year plans advocate a continually changing training content, there are repeated consistencies in the distribution of high-intensity training loads each training season.** Training systems identify the practical realization of training load distribution over a given time. The training systems described in the literature include such types as multi-method, integrated, or complex, linked-successive, or conjugative-successive training systems. **Regardless of the training system advocated, all of them make sparing use of anaerobic training loads.**

Lastly, we would like to clarify the terms, which have caused so much disagreement between sports training scientists and exercise physiologists. Jay Kimiecik has presented these insights in an article in American Coach[19]. These ideas are shown graphically in Figure 1[20]. Mr. Kimiecik quotes Steve Fleck, an exercise physiologist with the USOC: "The problem with a concept like overtraining is that no one knows what overtraining is, no one knows how it is defined. Researchers studying overtraining can't compare results because each researcher is defining the concept differently."

Jay Kimiecik further states the opinion of Bill Morgan, of the University of Wisconsin-Madison, "Morgan considers overtraining to be a prerequisite for peak performance and defines it as progressive increases in the training stimulus. By this definition, overtraining is a deliberate and planned process that all endurance athletes must go through to improve their performance." It is essential to distinguish between overtraining and staleness,

although that subject goes beyond the scope of this paper. Staleness bears the psychological connotation of elevating boredom—the, "I'm-tired-of-this; I-want-to-do-something-else" attitude.

If overtraining is a prerequisite to the acquisition of conditioning needed for maximum performance, is staleness also a prerequisite? Of course not. **By periodizing training into daily, weekly, monthly, and seasonal cycles, swimmers can vary their training programs and avoid boredom.**

Training routines composed of the various methods (overdistance, sprinting, anaerobic lactate training, interval training, and so on) not only have that advantage but expedite the training process. The performance of nothing but low-volume/high-intensity training, if excessive, would not only become boring and perhaps give rise to staleness, but it would also fail to develop all the qualities needed for optimal performance. Kinderman [21] has recommended that a weekly training cycle follow a pattern outlined in Table 3.

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Low int. Aerobic	Recovery	Recovery	Aerobic	Recovery	Low int. Aerobic	Interval or Fartlek
90-120'	45-60'	45-60'	90-120'	45-60'	90-120'	
	Anaerobic	High int. Aerobic 45-60'		Anaerobic		

Table 3.

Each session may include several methods of training. The primary type emphasized in a particular session appears in the appropriate square. Peak intensity occurs on days 2 and 5 when the swimmers perform anaerobic lactate sets. These two training sessions are the most intense of the week and are always followed by a recovery session of low-intensity aerobic training.

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Summary

Controversy has been rising within the competitive swimming community over the past few years because of the advocacy of two forms of swim training, which depart radically from traditional methods. They promise a Utopian scenario in which reduced time in the pool produces increased success in performance. **The truth is that these methods are not new at all.**

Many programs, bound by the restrictions of short pool time, have used them throughout the sport's history, hoping thereby to offset the lack of time in the water by increasing the intensity of effort. But the fact is that such programs do not produce great swimmers. The reality also is that **when a great talent begins to emerge from one of these programs, the coach must look for a program with more pool time in which to place his talented swimmer because he knows it will otherwise wither and fail.**

Such programs seldom produce swimmers at the highest level. We have received dozens of letters and phone calls from these frustrated coaches. They recognize that they must do something and want to know where to send their particular swimmers, who have outgrown their program. We are sure we are not alone in receiving such pleas. Yet here we are, faced with the fact that some coaches have hopped on the bandwagon of an idea that promises more for less.

A high-level program is not for everyone. That is as it should be**. The danger in promoting the less arduous and less time-consuming methods is that they claim to produce top-level performances and be superior to proven methods. You can talk or write all you want, but they aren't.**

Except for the performances of a few sprinters, who had already laid a traditional base, they have not produced a single high-level performance. We coaches are worried that, **while promises of less training time and less volume of training entice our swimmers and coaches, the rest of the world will surpass us.** The rest of the world has already begun to overtake us.

Swimmers who train conventionally produce the success we enjoy today. We no longer dominate the lists of the Top-20 in the world as we once did. Some say the rest of the world is catching up, rather than us falling back. Sociologists would say it results from the loss of will that inevitably afflicts any affluent society and makes it prey to easy rationalization. However, we don't want to get into that esoteric aspect of the question.

We want to say that **coaches should take care before adopting any radical departure from proven methods. It could be a step backward instead of forward.**

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Our young coaches are responsible for bringing along the swimmers from whose ranks our future champions would come. They won't come if ineffective methods are universally adopted.

We ask those coaches who are tempted to take shortcuts to examine both sides of the question. We hope the information we have presented will at least prove to them that there is a support system to the traditionalists' arguments. Our opposition has argued that the only rationale a coach can use to support his methods is that if something works, more of the same will work better. We didn't make up our methods off the top of our heads, as they believe. It seems to me that the logic of our argument overwhelms theirs with its rationality. **There is an enormous amount of agreement about it within the scientific community, and there is a history of success in its practical application.**

Footnotes

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World Swimming Coaches Association

Lessons from the 2016 Olympics

By Coach Don Swartz

Look at the "Swimming I.Q." of your team. Watch, react, and appreciate all the swimmers' work and their workout swims. Team USA built on those swims in training camp.

Learn to touch the wall ahead of the others. This was a key mantra. Team USA garnered something like 12 of its total 33 medals by a combined 2.7 seconds. They were extremely focused on touching the wall ahead of as many as possible.

Ask the question of your team, **"When did the switch go on for you?"** Every swimmer at the top has an identifiable moment in their career when that has happened. Know when that was for you.

Don't assume anything. Cover all the bases, even for world-class swimmers.

As a coach, you must **fight for excellence for your swimmers. It isn't cheap**. You must commit to it, and as a club coach, you may not get the credit or the limelight.

In an old Swimming World ad, Arena had a quote from Mahatma Gandhi that summarizes the difference between podium swims and the five other swimmers. It is a harsh assessment, but more often than not true. "**Strength does not come from physical capacity. It comes from an indomitable will."**