

## PART 4:



### PLANNING THE TRAINING OF THE ADULT ATHLETE



Taking athletes to a peak for important competitions requires careful planning. That planning can and should extend over several years. Obviously, this gigantic task must be broken down into smaller, more manageable units.

Ernest W. Maglisco , Swimming Fastest. (2003)

- **Essentials of Masters Athletes Training Programs**

### **Individualization**

As a consequence of the diversity of age, ability, health, morphology, experience, level of fitness and aspirations of Masters athletes the individualization of training programs is essential to the holistic approach to athlete development. Many have not participated in sport previously and have varying expectations associated with their competitive experience. Consequently a communal “one program fits all” approach is inappropriate. A rule of thumb would suggest that the less experienced participant will benefit more from volume of training whereas the more experienced is likely to benefit from greater emphasis upon training intensity. It is the responsibility of the coach to provide a training environment that is both productive and enjoyable.

### **Specificity**

This principle of training indicates that training be directed towards the energy system most utilized in a particular sport, not to mention the sport itself. Further characteristics will direct the coach to provide his or her athletes with the opportunity to develop aspects of speed, speed-endurance or anaerobic threshold, aerobic power and aerobic capacity. In turn, dependent upon the sport or event duration, appropriate percentages of effort, training duration, repetitions, sets, and recovery can be determined to develop the sport-specific energy pathways. There are instances where non-specific activity can be beneficial. For example in recovering from hard training, in providing variety in training and as a foundation for training. Cross training is appropriate to multi-event sports and general conditioning but not necessarily to improve another sport or event.

### **Overload**

Overload is perhaps the most fundamental building block of conditioning. Whenever athletes are subjected to a training stimulus, or intervention, which causes fatigue, adaptation occurs to allow the body to better cope with the additional demands. With increased fitness athletes are better able to adapt to higher workloads. Overload can be applied when determining volume, intensity and frequency of training. In doing so the coach must be vigilant to ensure that the negative effects of a poor diet, loss of sleep, emotional stress, travel etc., are not the forerunners of overtraining. Observing the principle of progressive overload will be of considerable assistance to the coach in this regard. Systematic and progressive application of the overload principle ensures that the training stimulus is varied over time. Insanity has been defined by some as the expectation of improved results from repetitively similar

training!

### MASTERS KEYS

- Training should begin slowly and progress gradually.
- Volume and/or intensity should be elevated in weekly steps of not more than 10%
- Training load should be cyclic, with harder sessions alternating with easier ones.

### Progression

The systematic process of increasing the overload of training is referred to as the principle of progression. Swimmers most commonly engage in interval training where the application of progressive overload is clearly evident through the manipulation of the four variables of number, distance, rest interval and speed of each repeat. Only by the utilization of this progressive overload will adaptation be stimulated and continued improvement be witnessed. The principle of specificity dictates that progressive overload be applied to sprint training and distance training in different ways.

Endurance is best improved when athletes train at a level slightly beyond their prevailing ability to maintain the balance between lactic acid production and its removal from the muscles. In contrast sprint work adaptation best occurs when athletes are encouraged to swim as fast as possible in the workout situation.

### Recovery

The relationship between overload and recovery is key to optimum progress and performance. Without the allowances made for recovery between training efforts, sessions, or cycles, fatigue and ultimately failing adaptation will result. The rate of an athlete's recovery can be indicative of the value of the training program. Skillful manipulation of training loads by the coach can ensure that athletes do not get too tired.

Alternating hard, medium and lighter practice sessions assists athletes to adapt to training loads by balancing work and recovery time. Opportunities to adequately recover become increasingly important with aging. Light exercising and stretching at the end of a practice session can accelerate recovery. Diet can also play an important role in recovery. More protein can aid tissue building and repair after intense hard work. When muscle glycogen is depleted consuming carbohydrates as soon as possible after

practice will see glycogen levels restored within 24 hours. Also important to the recovery process is adequate hydration.

When excessive volume or intensity of training occurs and is coupled with inadequate recovery chronic fatigue, staleness and injury can result. This state of overtraining is the catalyst for decreased exercise capacity and declining performance. Life demands themselves can also contribute to overtraining. This can be a significant issue for Masters athletes who should be encouraged to back off when they are experiencing significant stress from sources other than training.

Signs and symptoms of overtraining include:

- Chronic muscle soreness
- Decrease in appetite
- Decrease in exercise performance
- Decreased maximal heart rate
- Depression
- Increased irritability
- Increased recovery heart rate
- Increased resting heart rate
- Injuries and illness
- Loss of motivation
- Sleep loss
- Weight loss

### **Reversibility**

The principle of reversibility essentially indicates that it takes as long to lose training gains as it does to develop them. Accordingly interruption of training through illness or injury, detraining between competitive seasons, extended vacations and other disruptions can have a negative impact on both the short and long term development of the athlete. During season breaks it is important that athletes remain active to ensure that the transition to the next season is positive and that they enter the preparatory phase of a subsequent season at a higher level than was previously the case.

## Phases of Training – Periodization

“I used to plan my day around running. Now I plan running around my day.” Joan Benoit Samuelson, 1984 Olympic Marathon champion (2:24.52) who at 51 years old ran 2:49.08 in the 2008 US Olympic Marathon Trials [an average decline of 0.63% per year].  
New York Times, 13 April, 2008

Planning is an important responsibility for the coach particularly with respect to the development of training programs for Masters athletes. As an unknown sage planner has observed “failing to plan is the first step in planning to fail”! Periodization – the organization of a training program into phases and / or cycles each with a specific objective, volume and intensity, is the format utilized by coaches today when planning. The annual plan is the roadmap to attaining the athlete’s short-term goals. The plan when condensed onto the single sheet Yearly Planning Instrument (YPI) provides the template for documenting all the elements of the plan in a systematic, cyclical and progressive fashion. For the more experienced athlete the goal of the plan is to prepare the athlete for their peak performance at an identified important meet of the year. For the less experienced athlete(s) the focus is placed more on athlete development. The plan can also act as a monitoring system particularly in checking progress and averting overtraining. Most importantly the annual plan delineates a plan for both athlete development and the attainment of peak performance at the major competition of the season or year.

“A planned program of systematic progression is one of the best ways to ensure that swimmers reach physiological peaks at the right time of the season. Systematic progression should also help them avoid plateaus and overtraining. Initial progress may be slower when seasons are constructed in this manner , but swimmers will ultimately reach higher levels of adaptation and consequently achieve better performances.”  
(Maglischo, 2003).

The annual plan is best developed following completion of the previous year’s major competition when the coach is best able to reflect upon the effectiveness of the past year’s plan. In swimming a case could be made that planning should be multi-year based upon the scheduling of the FINA World Masters Swimming Championships every two years. From another perspective one might make a case for quintennial planning as masters swimmers ‘age-up’ , or move to new age group, every five years! At the other extreme some might argue that even annual planning is superfluous given the erratic and irregular attendance patterns of a segment of the masters swimming population. Planning and periodization does however provide direction for athletes as well as the coach. It further lends itself to annual review and subsequent modification.

Periodization is not an exact science and nor is coaching. Such planning does attempt to anticipate every eventuality that is under the control of the coach and athlete. In this manner improvement of the standard of performance through the continuous sequencing of periodic training cycles can be achieved in a given time frame. Although the concept of periodization was developed in the Eastern Europe, in Canada it has been adapted to best suit our culture by utilizing what is referred to as the “integrated model”. The athletes competitive opportunities are considered in concert with observations by the coach on athlete adaptability and response to rest. This information is further combined with the application of scientific principles of training and athlete monitoring. The art of coaching lies in the ability to make appropriate decisions regarding the prescription of workload in the form of both volume and intensity whilst at the same time acknowledging that it is possible to a great extent to organize success. Planning then reduces the possibility of mistakes. It ensures that all key variables are considered and at the same time increases the likelihood that resources are maximized. A plan charts a course for identified priorities and increases the probability for success. It also provides the foundation for ongoing assessment. Planning does not guarantee the generation of similar responses in all athletes, nor the addressing of every eventuality , or perpetual success.

Proper planning (periodization) precedes positive productive peak performance.  
Unknown coach

### **Structure of the training year**

To make the task of coaching more effective, meaningful and manageable the yearly training plan is usually broken down into training phases that in turn reflect competition priorities. Training phases are substantive divisions of the training year or season that each have specific objectives. Training divisions, or blocks, might include preparation, competition and transition phases. Annual plans may have one single peak or they may have multiple peaks depending upon the competitive goals for the year. Any one *macrocycle* generally embraces the preparation, competition and transition phases. These phases are often subdivided into sub-phases for example general preparation and specific preparation or pre-competition and competition. These in turn are sometimes divided into two to six week periods referred to as *mesocycles* each with a specific goal. The literature does interchangeably

also use the term ‘macrocycle’ and when doing so makes no reference to, or use of ‘mesocycles’. Each macrocycle, phase, sub-phase, and mesocycle is comprised of *microcycles* or training weeks of seven days, for ease of organization. Their respective content, presented in the training session itself, is organized in a manner best suited to the attainment of the mesocycle objective.

#### DIVISIONS OF THE TRAINING YEAR

TRAINING PHASE	SUB-PHASE	OBJECTIVE
Preparation	General preparation (GPP)	Establishment of foundational components of performance.
	Specific preparation (SPP)	Introduction of specific elements of performance.
Competition	Pre-competition (PCP)	Reinforcement and integration of performance factors with simulation of competition in training.
	Competition (CP)	Preservation and fine-tuning of performance factors; increased rest and specificity; tapering ; competition strategy.
Transition		Cross training and novel maintenance activities

## Steps in Plan Development

**1. Identify the trainable components that should be included in the training year.** Maglisco (2003) pinpoints thirteen factors that should be included in every season plan:

- Aerobic capacity
- Anaerobic power
- Aerobic and anaerobic endurance
- Stroke mechanics
- Optimum stroke rate and stroke length
- Strength and power training on land
- Flexibility training
- In-water power training
- Starts and turns
- Pacing and strategy
- Emotional preparation and mental toughness
- Nutrition
- Time management

**2. Identify program of competition:** All competitions should be identified and recorded on the Yearly Planning Instrument (see example below under point 8.) although many will be both competitive experiences and training where little in the way of pre-competition rest is scheduled. Peaking for every meet would undermine the systematic approach to training. The nature of the Masters competitive season in Canada suggest a double peak plan might be appropriate given the timing of the Provincial and National Championship meets followed by the open water season which varies depending upon geographical location. In other programs a two season yearly plan is dictated by a short course season followed by a long course season.

**3. Determine major competition peaks:** The yearly training plan can be developed once the major performance peak, or peaks, of the year are identified. These are synchronized with the timing of the identified major competition or competitions. It can be useful to employ a peaking index using a scale of 1-5 with most important competitions rated 1 and least important rated 5 or simply relate to the preparation phase(s) of the plan. This can be taken a step further where a like peaking index is employed to plot life demands.

The words of Joan Benoit Samuelson, quoted at the beginning of this section, may ring clear here! Nevertheless the athlete has to have some level of commitment to the plan or its success can easily be sabotaged by inappropriate lifestyle choices. Accordingly it is the responsibility of the coach to review the plan with the athlete or athletes in order to achieve “buy in” . The ultimate objective and challenge for the coach is to see that all training factors peak simultaneously and coincide with the major competition. As a result of the not inconsiderable length of the typical Masters swim year it is conceivable that a break in the season and training year might be provided by a vacation period as opposed to a competition, for example at the end of December. Such breaks can help to ameliorate the possibility of overtraining due to the extended season length and the busy lifestyle of many athletes that sometimes precludes optimal recovery.

**4. Identify required macrocycles:** Usually the number of competitive peaks will determine the number of macrocycles in the annual plan. For example if there is an indoor and an outdoor season or open water season, as often there is in Canada, the delineation of two macrocycles will result in encompassing the appropriate phases and sub-phases. The length of a macrocycle can vary from the length of a season to simply embracing a particular part of a season e.g. taper period. The macrocycle itself comprises a number of mesocycles which themselves may be sub components of specific phases. The General Preparation Phase (GPP) usually has as its principal objective the preparation of athletes for increased volume and intensity later in the season. A major focus at this time will be upon the improvement of aerobic capacity and therefore overload in this phase is characterized by increased volume. The use of cruise interval swimming is commonly found in many masters programs. A description of their use appears later in this chapter. Lactate production and power training is also incorporated into the GPP in order that these components are not compromised by too much endurance work and are maintained. Nevertheless such training is best used sparingly. Descending sets are effective here as are a few fast repeats near the end of basic endurance sets. Skill improvement is a major objective of the GPP and should encompass not only stroke technique but also starts and turn work. The reader is referred to the Stroke Evaluation Tools to be found in Appendix V. As skill improvement is reflected in stroke efficiency the monitoring of both stroke rate and stroke length, or distance per stroke can be instructive. Since this measure of swimming efficiency can easily be objectively measured by both coach and athlete it can act as a powerful motivator in this regard. The GPP is an opportune time for the utilization of stroke counting drills which are described later in this section.

The objectives of the Specific Preparation Period (SPP) are dictated to a greater extent by the events for which the swimmer is preparing as well as their respective state of physiological readiness. Progressive overload during this phase is characterized by increased volume and intensity. This is best reflected in basic endurance, threshold endurance, overload endurance, and power training in association with appropriate opportunities for recovery and regeneration – the most important ingredient in any training program. Without the chance to rest and to adapt to training interventions progress in fitness and performance levels will be meager. Skill development in the SPP should focus upon increased stroke length with marginal stroke rate change.

The Race Preparation, or Competition Phase, is broken down into the Pre-Competition Phase (PCP), the Competition Phase (CP) and Taper Phase. The improvement of aerobic

and anaerobic muscular endurance is the primary objective of these phases. For the swimmer this means increasing the amount of training completed at or towards desired race pace. Such training is perfect for instilling pace and strategy. Increased swimming speed in concert with reduced send off times, with appropriate recovery, is indicative of further progressive overload. Maintenance of near optimal stroke length and stroke rate should be pursued under fatigued conditions. During the taper phase training should decline to a maintenance level. Frequency, intensity and volume should decrease in order to facilitate athlete recovery. Tapers reflecting individual needs and adjustments are likely to be the most effective given the multi-factorial nature of producing a peak performance.

**5. Identify the required mesocycles:** These training blocks, usually with a distinct theme or objective, are allocated on the basis of the planned sequence of training. They reflect, or are subdivisions of phases or sub phases, and often between 2 and six to eight weeks in duration. They can be simplified into four week monthly blocks or varied to best reflect the respective training or competition phase. Typically in preparatory phases training load is progressively built up and then reduced before the next mesocycle to facilitate recovery. As such they represent the primary building block for progressive overload. In competition phases training load is usually reduced to accommodate tapering and preparation for competition. The opportunity for periodic adaptation and regeneration allows for more progressive improvement whilst also decreasing the chance of overtraining. Such relative rest periods permit desired adaptations to be realized and are reflective of the theory of super-compensation proposed by Yakolev (1967). The length of the taper should be determined first followed by the

remaining sub phases. In endurance sports mesocycles tend to be of longer duration whilst in explosive sports they are generally shorter to facilitate exposure to greater central nervous system stress and associated recovery.

**6. Determine the volume and intensity of training:** Volume and intensity are two of the most important components of training. At the outset of the training year or season both volume and intensity will be low depending upon the level of fitness of the athlete or group. As the season/annual plan progresses these two factors are generally inverse such that when one factor increases, the other decreases. The volume of training includes: a) the total number of practice sessions and time set aside for them b) the total distance completed or weight lifted per unit of time c) the number of repetitions of an exercise or skill performed in a given time. Volume of training is best determined by using an appropriate unit of measurement. Intensity of training relates to the quality, rather than quantity, of training. Whilst this readily brings to mind muscular effort during a specific period of time the psychological stress involved has also to be recognized. Intensity is sport specific. It can be determined by heart rate, velocity, percentages of best performance, ratings of perceived exertion, energy system utilized or even blood lactate levels. Maintenance of skill level 'under pressure' can also be evaluated. Accordingly identifying the optimal combination of volume and intensity is a challenging and sport specific task usually reflected in percentage terms on the YPI graphic (see diagram below).

**7. Identify the required micro-cycles:** For ease of organization micro-cycles are of one week in duration how ever they can vary from one to ten days. They contain a sequence of training sessions scheduled in the best way to achieve the objectives of the mesocycle via appropriate manipulation of the training volume and intensity. These should also reflect the adaptation and progress demonstrated by the athlete or team. The actual planning of the training sessions needs to be flexible in order to take into account how the athlete is responding to the training, and competition load at any particular time. Microcycles are designed to both pursue mesocycle objectives and to provide for recovery and regeneration particularly with increasing age in Masters sport and where competition may be as regular as every week. A micro-cycle ought to include all types of training – basic, threshold, overload endurance and power training . For swimmers intense sets should be scheduled at least twice per week provided the opportunity for replenishment of muscle glycogen and repair of muscle tissue can be achieved in-between. Where athletes train but once a day the matter of glycogen replenishment may be moot. Recovery sets within such workouts however are also important. Basic endurance should

be a feature of daily training as should an appropriate pool warm up including drills, a main set planned to increase aerobic capacity, aerobic and anaerobic muscular endurance, and anaerobic power, pulling and kicking, integral skills e.g. underwater kick, and swim down.

An example of a weekly micro-cycle training plan

Monday Objective : aerobic capacity, aerobic and anaerobic endurance  
Main set(s) : mixed basic, threshold and overload endurance  
Meters : 4000

Tuesday Objective : aerobic and anaerobic endurance, speed.  
Main set(s) : lactate production (300-400m), overload endurance (800m)  
Meters : 4000

Wednesday Objective : recovery  
Main set(s) : basic endurance  
Meters : 3000

Thursday Objective : aerobic and anaerobic endurance, speed.  
Main set(s) : lactate production (300-400m), overload endurance (800m)  
Meters : 4000

Friday Objective : aerobic capacity, aerobic and anaerobic endurance  
Main set(s) : mixed basic, threshold and overload endurance  
Meters : 4000

Saturday Objective : aerobic and anaerobic endurance, speed.  
Main set(s) : lactate production (300-400m), overload endurance (800m)  
Meters : 3000

Sunday Rest day

Weekly total : 22,000m

Sample workouts

Warm up: 600 FS

6x100 FS Sprint last 25 on 2:15  
500 50 BK 50 FS

10x50 Pull on 75  
400 50 FS 50 BR

8x50 Kick Choice on 1:30  
300 50 BK 50 BR

6x50 25BK25FS/25BR25FS on 1:10  
200 FS/AOS

4x50 on 60 secs ascend 4000m

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Warm up: 200FS 200AOSP 200K Choice

4(3x50)on 65  
#1 FS, #2 Any Other Stroke/FS, #3 FSP, #4 AOS

8x25 Choice Build Up each 25 on 30

8x100 1-4 Every Other25Fast, 5-8 EO50F on 2m

8x25 choice on 30 active recovery

4x100 Sprint EO25 on 2:30

8x25 choice active recovery

Swim Down:

100 Sw, 100 K, 100 Sw, 100 P, 100 IMK, 100 Sw Choice 3600m

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200FS ; 600 – 100 Fs 50 Choice  
200 K No Fins; 200 P 50 Fs 50 Choice

3(8x25)Odd 25's Fast: 1. Fly;2-4Fs;5-6 Bk; 7-8 Fs on 35 on 5mins

12x50 P #' 2,5,8 & 11 F on 60  
8x75 K + Fins last 25 F on 1:30

3{100 on 2m

{ 75 on 1:30

{ 50 on 60

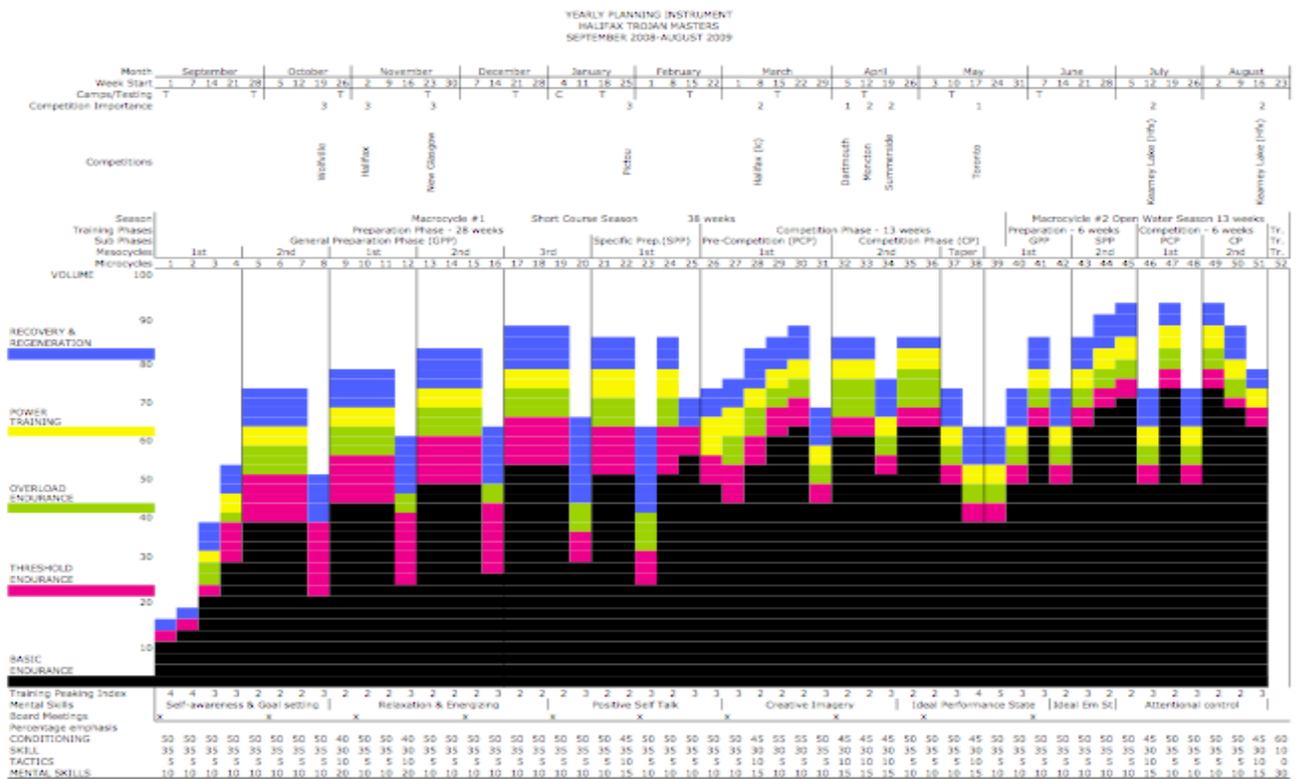
{ 25 on 30 on 6mins last 25 Fast

Swim down: 250 Ez

4000m

**8. Schematize plan:** The Yearly Planning Instrument allows the coach to present, in diagrammatic form, a summary of the annual plan with all its constituent parts. This allows for ease of reference and explanation particularly when showing an athlete or team just how the objectives of the training year are to be attained. It should be noted that the plan below is general in nature and should be adjusted to best fit individual training environments. Such plans can be further individualized to specifically suit middle distance and distance swimmers, 50 and 100 sprinters as well as 100 and 200 sprinters.

Sample Yearly Planning Instrument Schematic



**9. Development of YPI checklist:** The value in the development of such a list is to ensure that all bases are covered on an annual basis. The checklist also ensures that factors which may have been overlooked, or inappropriately emphasized during the progress of the training year, are subsequently addressed. Additions to the checklist can also be derived from the coach's record of training activities and practice evaluations which in turn can inform the evaluation of macro and mesocycles..

Clearly performance is based upon many factors and desired outcomes can be achieved in a number of different ways. The panacea for improvement is not simply the enhancement of one or two aspects of training but rather the successful integration of the multiple training components in both the planning and training process itself. Indeed the coach must be prepared to adjust the plan when anticipated progress is not observed. Planning does not guarantee success but without it the chances of success are greatly diminished. Ultimately, when all things are considered, the paramount outcome of periodization is that it can be the catalyst for athlete improvement, continued participation and pursuit of goals in swimming and indeed in any sport.

### **Test Sets**

Test sets can be used to monitor both an individual swimmer as well as a teams response to training and act as a ready tool to assess specific swimming fitness factors. The following benchmark/goal/test sets can be used throughout each macro-cycle. Tests should be administered regularly, e.g. one test every three weeks. The recording of recovery heart rates following aerobic capacity tests can assist in a tests interpretation where such data is accurate and the swimmer has provided an honest effort. For increased accuracy the testing environment should be as similar as possible. Results should be communicated with each respective athlete in order that they become increasingly aware of just what they are capable of. Often rest intervals for masters swimmers may need to be longer depending upon ability level.

**400 Kick for Time** – An aerobic capacity test that also monitors improvements in kicking technique. The test is short enough to engage swimmers who do not relish longer test sets.

**20 Minute Swim** – An aerobic capacity set where the goal is to complete as many lengths as possible in an even pace fashion.

**4x50 all out on 2 minutes** – A simple test of anaerobic power. This test is also useful to approximate the swimmers 100m time by averaging the four 50m times and doubling.

This should be able to act as a positive motivator when comparing the predicted time with the swimmers current time. The usefulness of this test can be increased by also taking stroke counts, and recording them for comparative purposes.

**8x150 best average on 3:15** – A test of aerobic and anaerobic muscular endurance. It provides an indication of changes taking place above the anaerobic threshold and the balance between aerobic and anaerobic training. Record the range and average of the swimmers times.

**10x50 all out on 1:30** - A test of aerobic and anaerobic muscular endurance for sprinters. A determination of the average time is the major statistic desired from this test set.

**30x50 on 1:10** - A test of aerobic and anaerobic muscular endurance more particularly focused upon stroke efficiency. Accordingly both average time and stroke counts are recorded.

**16x25 on 1:00** – A challenge set, although aimed at anaerobic power, provides swimmers an opportunity to race each other in a low key environment. The goal for the swimmer is to complete each 25m swim at a pace faster than their current 100m time (divided by 4) for the respective stroke as the 25's are completed in IM order. This opportunity can help increase the swimmers confidence levels with respect to their ability to race whilst also reinforcing the fun elements of competition.

**Dive 15m Dolphin Kick** – An anaerobic power test that also incorporates an important race skill. Swimmers perform a racing start, tight streamline, and fast dolphin kick until their head passes the 15m mark where they are given their time. Repeat 2-3 times with at least a 1:7 work to rest ratio.

Montgomery and Chambers (2009) describe a variety of goal sets used to assess swimming fitness levels. As seen in the table below, modifications are provided for every level of swimmer.

## Sample goal sets

<b>Level</b>	<b>50s</b>	<b>75s</b>	<b>100s</b>	<b>150s</b>	<b>200</b>
<b>Advanced</b>	16x50 on 1:30	10x75 on 2:00	8x100 on 2:30	5x150 on 3:00	4x200 on 4:00
<b>Experienced</b>	12x50 on 1:45	8x75 on 2:30	6x100 on 3:00	4x150 on 4:00	3x200 on 5:00
<b>Novice</b>	8x50 on 2:00	5x75 on 3:00	4x100 on 4:00	3x150 on 5:00	2x200 on 6:00
<b>Tri &amp; OWS</b>	6-10x200	4-7x300	3-5x400	2-3x800	1x2000

## Masters Swimming Canada

Further variety and diversification can be added to masters swim programs by involving swimmers in a range of MSC programs that provide both challenge and satisfaction :



## Stroke efficiency

The ready availability of video has provided both swimmer and coach the opportunity to monitor not only stroke technique but also stroke efficiency. This can objectively be measured by calculating both stroke rate (SR) and stroke length (SL) which is also referred to as distance per stroke (DPS). SR can be expressed in cycles/min and/or time/cycle where one cycle in backstroke and freestyle is represented by completion of both left and right arm pulls, whilst in butterfly and backstroke is recognized as one complete stroke. SL represents the distance the swimmer travels during each stroke cycle.

Repeat times in training and split times in competition have long provided information regarding

swimming velocity (see Appendix VI) however it gives little insight into how the time was achieved. Some major meets around the world now provide information on race components such as start time, turn time, turn index, clean swimming speed and finish time through the use of video cameras, digitization software and manpower. The beauty of utilizing a stroke efficiency index where both stroke rate (cycles/distance) and swimming time are collected and added together is that this can be done by the swimmer simply utilizing the pace clocks at each end of the pool. The swimmer is then presented with the conundrum of attempting to reduce the total by firstly swimming faster with fewer strokes, or secondly reducing the number of strokes with the same time, or thirdly maintaining the number of strokes and swimming faster, to ascertain the optimal relationship between SR, SL and swimming speed over a particular distance. This relationship will of course change depending upon the distance or event to be swum. The challenge described here has been developed as a drill identified as SWOLF because of its likeness to the handicap in golf. Other drills to develop this capacity are described by Maglischo in *Swimming Fastest* (2003).



Some stop watches can calculate stroke rates in cycles/min together with split times.

### **The Use of Cruise Intervals for Masters Swimmers**

One of the major values of the cruise interval (CI) is its capacity to provide a means of easily adapting swim practices to the skill, and prevailing fitness level, of the athlete. It represents a progressive way of developing endurance. Its use is ideal for sets lasting 15 minutes and over. CI's can be utilized for full stroke sets, including IM as well as for both kicking and pulling sets. Athletes can select a repeat distance (25, 50 75 or 100yds/m) that best reflects their current skill and fitness level and can be completed within one minute and one and three-quarter minutes for ten repeats. As a rule of thumb swimmers should add a length to their repeat when cruising at under one minute and subtract a length when taking over two minutes to complete the repeat. To determine a swimmers initial cruise interval they should be timed (or time themselves) for the completion of ten repeats of the selected distance

whilst taking a ten second break between each repeat. Swimmers should proceed at a medium and, if possible, even pace. The chart below can be used to identify the swimmers cruise interval from their Broken Swim Total Time.

When training with CI's ideally every swimmer in the same lane should be completing the same distance repeats. They are tasked with completing as many repetitions as possible in the time allotted e.g. 15minutes. Swimmers should be encouraged to descend their repeats in order to achieve the average split pace time. An ability to exceed the split indicates improvement in endurance. All swimmers should be having ten seconds rest before commencing the next repeat. When swimmers average over 15 seconds of rest then they show signs of readiness for a five second faster repeat. Innovative coaches can introduce variations on the cruise interval to create variety and more challenging sets:

- 3x200 on CI
- 3x200 on 100 CI x 2
- 4 x 50 on CI
- 4 x 50 on 100 CI/2
- 2 x 100 on CI -5
- 2 x 100 on CI +

**MASTERS SWIMMING CRUISE INTERVALS**

<b>Broken Swim Total Time</b>	<b>Average Split Swim Time</b>	<b>Lane Interval Assignment</b>	<b>Broken Swim Total Time</b>	<b>Average Split Swim Time</b>	<b>Lane Interval Assignment</b>
5:50	:26	:40	13:20	1:11	1:25
6:00	:27	:40	13:30	1:12	1:25
6:10	:28	:40	13:40	1:13	1:25
6:20	:29	:40	13:50	1:14	1:25
6:30	:30	:40	14:00	1:15	1:25
6:40	:31	:45	14:10	1:16	1:30
6:50	:32	:45	14:20	1:17	1:30
7:00	:33	:45	14:30	1:18	1:30
7:10	:34	:45	14:40	1:19	1:30
7:20	:35	:45	14:50	1:20	1:30
7:30	:36	:50	15:00	1:21	1:35
7:40	:37	:50	15:10	1:22	1:35
7:50	:38	:50	15:20	1:23	1:35
8:00	:39	:50	15:30	1:24	1:35
8:10	:40	:50	15:40	1:25	1:35

8:20	:41	:55	15:50	1:26	1:40
8:30	:42	:55	16:00	1:27	1:40
8:40	:43	:55	16:10	1:28	1:40
8:50	:44	:55	16:20	1:29	1:40
9:00	:45	:55	16:30	1:30	1:40
9;10	:46	1:00	16:40	1:31	1:45
9:20	:47	1:00	16:50	1:32	1:45
9:30	:48	1:00	17:00	1:33	1:45
9:40	:49	1:00	17:10	1:34	1:45
9:50	:50	1:00	17:20	1:35	1:45
10:00	:51	1:05	17:30	1:36	1:50
10;10	:52	1:05	17:40	1:37	1:50
10:20	:53	1:05	17:50	1:38	1:50
10:30	:54	1:05	18:00	1:39	1:50
10:40	:55	1:05	18:10	1:40	1:50
10:50	:56	1:10	18:20	1:41	1:55
11:00	:57	1:10	18:30	1:42	1:55
11;10	:58	1:10	18:40	1:43	1:55
11:20	:59	1:10	18:50	1:44	1:55
11:30	1:00	1:10	19:00	1:45	1:55
11:40	1:01	1:15	19:10	1:46	2:00
11:50	1:02	1:15	19:20	1:47	2:00
12:00	1:03	1:15	19:30	1:48	2:00
12;10	1:04	1:15	19:40	1:49	2:00
12:20	1:05	1:15	19:50	1:50	2:00
12:30	1:06	1:20	20:00	1:51	2:05
12:40	1:07	1:20	20:10	1:52	2:05
12:50	1:08	1:20	20:20	1:53	2:05
13:00	1:09	1:20	20:30	1:54	2:05
13;10	1:10	1:20	20:40	1:55	2:05