THE MASTERS ATHLETE

ISSUE 1 JUN 95

A total fitness guide to optimise training and performance for the older athlete

Interval Training for Older Athletes

by Dr. Peter Reaburn

I'm getting older but refuse to believe I have to get slower. However, having just hit the big 4-0, I have to face the facts - the 10km run time ain't what it use to be and the 400m swim times are slowing. Sure, as a sports scientist I'm aware my ability to pump blood and oxygen is reduced and I'm losing strength - both of which will contribute to reduced endurance speed. However, as a sports scientist I also am aware there is something I can do to try and hold my speed - Interval training.

The few studies that have examined training habits of older athletes have shown that the older we become, the more we do mileage and the less we focus on intensity or how hard we train. Maybe this is due to us losing a little motivation, not being interested in hurting anymore, or we're just training for enjoyment and health. Unfortunately, training slower means we race slower. To race fast we must t.

cles are made up of small fibres. These muscle fibres are basically of three types - slow twitch, fast twitch a, and fast twitch b. The slow twitch are endurance fibres - they contract relatively slowly but are fatigue resistant. The fast twitch a fibres are speed fibres and are also fatigue resistant. The fast twitch b fibres are also for speed but fatigue very quickly. Genetics determines the percentage of these fibres we are born with so blame mum and dad if you're not fast or don't have endurance.

So why are we discussing muscle structure? Well the important point (as shown in figure 1) is that when we train slow, we only train the slow twitch fibres and therefore will have good fatigue resistance. This is obviously important for iron man/woman triathletes, road cyclists and marathoners, but what about the shorter events. As figure 1 suggests, the faster we train, the more fast twitch fibres we use. The important point is that if we train hard enough to use the fast twitch b fibres that fatigue easily, we can convert them into fast twitch a fibres that give us speed but are resistant to fatigue - just what we need for speed endurance. However, if we do speed training too hard or too long using the fast twitch b fibres, we will produce lactic acid which Dr. David Jenkins in another article has suggested leads to fatigue. The answer is therefore to train a particular way that uses those fast twitch b fibres but does not produce high levels of lactic acid - interval training.

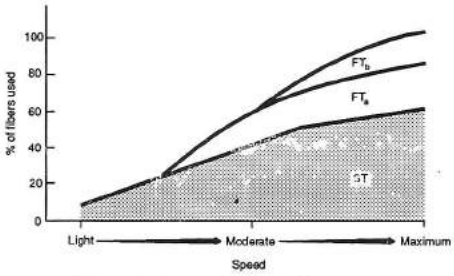

Figure 1 - Increasing speed increases the number of fibres we use

While interval training can be used in a wide variety of ways, interval training to improve speed for endurance events should consist of relatively short (e.g. 30-90 second intervals with short rest - half or less of the interval time). Examples of intervals in a variety of sports might be:

	Swim	Bike
Set	10 x 100m free	15 x 1min. efforts
Time	90 secs	1 min
Rest	25 secs.	30 secs.
Intensity	85%-90%	85%-90%
	Run	**Row**
Set	8 x 400m	10 x 1min pieces
Time	90 secs.	1 min.
Rest	40 secs.	30secs.
Intensity	85%-90%	85%-90%

The key to such training is that the quality of the last interval is as good (or even better!) than the first. If we go too hard in the first interval, we'll have to recover for longer than we should, or the rest of the intervals won't be as good. Looking at figure 2 below will act as a guide. The set is a set of 400m runs with 200m recovery and the heart rate at 85% of maximum heart rate is 162. Note how the heart rate goes slightly above that figure during the 400 then drops below it 10-15 beats during the jog recovery. I see too many athletes (young and old) who either go too hard too early (generally the young bucks!) or take too long a rest. The key is to have fluctuations of 5 -10 beats above and below during the interval and recovery, respectively.

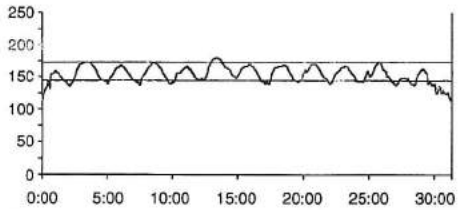

Figure 2 - Heart rate curve for a set of 10 x 400m runs at anaerobic threshold pace (warm up/down included)

It sounds so easy you might say. For masters athletes such training is the answer to improving your speed over longer distances. In the older athlete this type of training becomes very important because muscle biopsy studies have shown that as we age we lose both the size and number of these all important fast twitch fibres we need for speed. Although not scientifically proven, interval training might go a long way to preventing this decline in fast twitch fibre size. However, a word of caution! Interval training is hard work. It should be done when we are fresh, after we have developed a good aerobic base of easier work, after a good warm-up, followed by a warm-down and stretching, and be followed the next day by recovery training such as an easy 20-30 min. run/swim/bike/row. I would also suggest that only two sessions per week of this type of work be done since it can lead to injuries and visits to physiotherapists for athletes that do too much of it, have poor technique, or have not built their training program progressively to the point where they can cope with this type of work. *Try it!*

This Issue..

Welcome to the first issue of The Masters Athlete, a unique publication written by masters athletes for masters athletes. Our aim is to provide you, the older athlete, with nuts and bolts information that will optimise your training and performance. As this is a new publication, we welcome any feedback or topic suggestions you may have. Thanks for supporting the publication and we hope to hear in the near future of improvements in your performance as a result of reading The Masters Athlete.

Exercise Addiction: When Exercise Controls the Person

by Dr Stephanie Hanrahan

Regular exercise or training can obviously be very beneficial for us - physically, mentally, and emotionally. For some people, however, exercise becomes more than just a positive health habit, it becomes an addiction. Exercise addiction shares fundamental characteristics with addictions to other substances or activities such as drugs, gambling, or alcohol.

Tolerance

■ Most of us are probably aware that one of the signs of drug addiction is that addicts require more and more of the drug to get the same effect. The same is true of exercise addiction. Because physical and psychological tolerance to exercise occurs after repeated training, more exercise is needed to feel the same sense of fatigue or achieve the same sense of satisfaction. Tolerance by itself, does not indicate the existence of addiction. Almost all of us have experienced an increase in tolerance to exercise as we become fitter. If, however, tolerance is accompanied by signs of craving and dependence, addiction is probably present.

Dr Stephanie Hanrahan

Craving

■ Cravings cause the object of the craving to become of greater importance than other aspects of life. With exercise addiction, going to the gym, getting in the 20 km run or the 9th swimming session of the week may be of greater importance than family, work, or other commitments. The desire to exercise exceeds common sense. Exercise is thought to be necessary even if environmental conditions or personal illness or injury would suggest otherwise. Just as with other addictions, the desire to appease exercise cravings can result in physical harm, the loss of jobs, and the break-up of relationships and families. We all might be very highly motivated to train, but when the desire to train overrides everything else, problems ensure.

Dependence and Withdrawal

■ Dependence on an activity or substance often goes unnoticed. If an alcoholic continues to drink, withdrawal will not be experienced and dependence may not be noted. Comparably, if an exercise addict trains on a regular basis without interruption, dependency and withdrawal may not be noticed. If, however, circumstances arise which interrupt the drinking or the exercising, then signs of dependency and withdrawal may become apparent. An exercise addict who is not able to exercise will experience psychological withdrawal which can take the form of guilt, depression, anxiety, or irritability. In some cases even the thought that one might not be able to exercise brings on these feelings associated with withdrawal. After awhile the addict exercises to avoid the discomforts of withdrawal. Training is no longer a pleasurable activity, but rather something to be done to avoid feeling worse.

Dependence and withdrawal go unnoticed as long as training can be maintained. However, as tolerance and cravings become stronger, the time needed to exercise increases. As the quantity of exercise escalates there is a greater chance that a training session will be missed or cut short, thereby increasing the chances of experiencing withdrawal. This process can continue as a viscous cycle until training becomes the most important facet of life.

Denial

■ Just like other addicts, exercise addicts often tend to deny that they have a problem. Making excuses or rationalising become common methods of justifying their behaviour or denying that a problem exists.

Possible Problem Reasons for Exercising

Exercise needs to be kept in the proper perspective. Training should be enjoyable. If it becomes a dreary obligation, it is probably being done for an unhealthy reason. Some of the common reasons underlying exercise dependency are as follows:

Avoidance Behaviour - exercising to avoid uncomfortable life situations; with a lot of time required for exercise, individuals don't have time to establish relationships or deal with problems at work and while exercising they can "get away" from thinking about specific issues. Possible solution: Develop other sources of coping with problems; stress management.

Obsessive-Compulsive Behaviour - training sessions can often be organised into orderly times, distances, repetitions, or sets; always following the same routine no matter what, can give individuals a sense of control over their lives; if an exercise session is missed or changed, they can feel as if they are losing control. Possible solution: Try to focus on the enjoyment of the activity rather than the number of laps, repetitions, or kilometres; gradually add variety to training, changing the type and duration of activities.

Relieving Depression and Anxiety - exercise can have a positive effect on ourselves physically and mentally; possible problems may exist when the amount of exercise is increased to get the same effect on mood, when moods are positive only when exercising, and when just the idea of missing a training session causes an increase in depression or anxiety. Possible solution: Exercise only at predetermined times rather than in response to changes in mood; change at least one exercise session per week to a form which involves contact with other people; explore other approaches for handling anxiety and depression.

Body Image Problems - exercise addiction as a result of poor body image is often accompanied by false beliefs that individuals will be happier, more successful, or more popular if only they change their body shape; these individuals often fear that missing one workout will have a noticeable and negative impact on how they look. Possible solutions: Examine thoughts and beliefs about exercise and body shape and what it means to be successful.

Eating Disorders - this topic is too complex to cover in this article, but the basic idea is that exercise addiction often coexists with eating disorders.

In summary, while many of us experience some signs of exercise addiction, our training behaviour isn't problematic unless training is no longer enjoyable or we feel we are being controlled by training. Getting in the 20 km run or the 9th swimming session of the week may be of greater importance than family, work, or other commitments. The desire to exercise exceeds common sense. Exercise is thought to be necessary even if environmental conditions or personal illness or injury would suggest otherwise. Just as with other addictions, the desire to appease exercise cravings can result in physical harm, the loss of jobs, and the break-up of relationships and families. We all might be very highly motivated to train, but when the desire to train overrides everything else, problems ensure.

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Overview of Training Nutrition

by Holly Frail

Optimal nutrition practices should be an integral part of every athlete's preparation for competition. However, the hours we spend on the road or in the water during training far outnumber those actually spent competing. Everyday eating and drinking practices form the essential platform from which our best performances arise.

As the first in a series of articles focussing on the nutritional needs of the masters athlete, let's start by following the 'Athlete's Dietary Guidelines', remembering that many individual factors such as sex, size, sport, metabolic rate, underlying medical conditions and food preferences determine the exact make-up of our daily intakes.

The dietary guidelines for the masters athlete are:

- Enjoy a wide variety of foods in order to meet fuel and nutrient needs
- Eat plenty of wholesome carbohydrates
  a low fat diet
  ntain a healthy body weight
- ı ɟou drink alcohol, limit your consumption
- Drink more water
- Eat only moderate amounts of sugar
- Choose low salt foods

Variety is the essence of enjoyable eating. Anyone who has travelled will realize that Australia has one of the best range of food choices all year round. We also possess eating establishments serving quality cuisine from virtually every country in the world. The best rule is to explore this available variety and not become fixed on a restricted range of foods simply because they have been identified as good choices of your required nutrients.

Carbohydrates are the most easily digestible energy source used by working muscles and the preferred fuel for all types of training. Lack of carbohydrate in your diet leads to inadequate glycogen stores in the muscles and liver. and an inability to maintain blood glu- ·els - both leading to early fatigue, loss ɜntration, and poor recovery from train- competition. When we train on a daily basis - particularly for endurance sports - we require at least 6 - 8 grams of carbohydrate per kilogram body weight per day. This should be spread over more frequent, smaller meals centred around carbohydrate rather than fat and protein. The following foods are examples of good sources of carbohydrates:

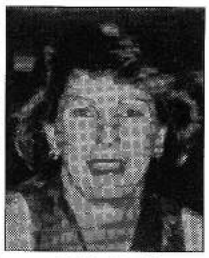
Food	Amount	Grams of Carbohydrate
Orange juice	One cup	27
Skim milk	One cup	12
White bread	One slice	12
Bagel	One	31
Muffin	One	17
Pasta/Noodles	One cup	39
White rice	One cup	57
Potato	One	34
Yoghurt	One cup	43

Small amounts of simple **sugars** such as cordial, sports drinks, jam, and honey may be helpful during periods of high energy expenditure. However, excess sugars can lead to vitamin, mineral and fibre deficiencies.

We also require small amounts of dietary **fat** to provide essential fatty acids and fat-soluble vitamins (A, D, E, K). Fat is predominantly used as an energy source during long, low intensity exercise and supplies, for the same number of grams, twice the kilojoules as the same amount of carbohydrate and protein. However, we all have more than adequate fat stores for exercise, irrespective of how lean we are. Excess dietary fat intake may lead to the storage of excess body fat and inability to reach carbohydrate goals.

Our individual energy intake should be regulated so that we reach and maintain a healthy optimal **body weight** and body fat level, without compromising our ability to train. This means watching fat and alcohol intake, but not skimping on essential carbohydrates, or overeating for the wrong reasons such as boredom or stress. We also must ensure small frequent meals with sufficient energy intake so as to not risk a lowering of our metabolic rate.

All athletes require a slightly larger **protein** intake than non-exercisers. In most cases the additional amounts of protein are easily provided by your increased total energy intake - provided the diet is balanced. Protein is found in meat, poultry, fish, dairy products, legumes and grains and is required for growth, maintenance and repair of all the body's tissues. It is not a significant source of energy and is usually only utilized to a small extent, mostly when the stores of muscle and liver carbohydrate (glycogen) run out. For those masters athletes wanting to increase their lean body (muscle) mass, do not feel you need to buy expensive protein powders found in gyms or healthfood stores. You should just follow a high carbohydrate, moderate protein, low fat diet combined with specific resistance (weights) training. The recommendations for protein intake are:



Holly Frail

Sedentary person	-	1 gram protein/kg/day
Endurance athlete	-	1.5 - 1.6 gram protein/kg/day
Power/Strength	-	1.2 - 2 grams protein/kg/day

Water is an essential nutrient for all athletes. In practical terms, failure to replace fluid losses during exercise may lead to fatigue, muscle cramps, inability to control body temperature, loss of concentration, headaches and gastric upsets. All of these may result in reduced performance. Thirst is a poor indicator of your fluid needs. A sensible recommendation is to weigh yourself before and after training and replace 1 litre of fluid for every 1 kg of weight lost. Sodium and potassium are also lost in sweat. However, as fitness improves, these electrolytes are better conserved by your kidneys. Additional salt is not required if you suffer from muscle cramps, in fact this practice is more likely to increase the risk of them occurring.

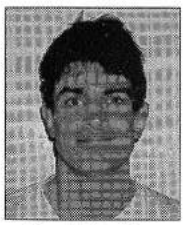
Alcohol, although enjoyed by many masters athletes to relax after a hard day's training or competing, has a number of detrimental affects on recovery and performance. These include further dehydration, and exacerbation of soft tissue injuries. Ensure you replace fluids and carbohydrate after exercise before indulging in the 'healthy' intake of up to two standard drinks per day for females and three or four for males.

Now that issue one of **The Masters Athlete** has given you general guidelines for sports nutrition, specific details about how to attain these dietary goals and maximize performance through nutrition will be discussed in future issues. Stay tuned!

Lactate - The Villain or a Good Guy?

by David Jenkins

Lactate has long been seen as a bad guy by athletes. Fatigue as a result of hard exercise has long been associated with high levels of blood lactate - hence the contempt with which lactate is held by most athletes. However, our knowledge of lactate production, removal and its relationship with fatigue has improved enormously over the past 15 years. From what we now understand, lactate should no longer be considered the single cause of decreased performance. This brief article aims to place lactate in a new perspective.



David Jenkins

Lactate is produced from glycogen (muscle carbohydrate) *normally* in an 'anaerobic' (oxygen - free) environment. The higher the intensity of exercise, the higher the level of blood (and muscle) lactate. Biochemically, the build-up of acid caused by lactic acid production can interfere with the chemicals necessary for energy provision and impair the muscle contraction process - leading to a fall in power output and thus performance. Despite these problems, two other potential causes of fatigue are attracting considerable attention from leading Australian sports scientists. Firstly, sprint performance seems to be affected by loss of potassium from the muscle. Secondly, accumulation of calcium within the muscle cells during exercise has been linked to fatigue. I should add at this point, that dietary intake of potassium and/or calcium will have no influence on these changes. The problems during hard exercise reside in the exercising muscle and they only seem to be overcome with appropriate training.

You may be aware of the potential benefits of taking sodium bicarbonate (yep, the stuff in the kitchen cupboard!) before sprint exercise. Sodium bicarbonate or baking soda taken in the right dosage (0.3g per kg of body weight in 1 litre of water 60-90 minutes before racing) supposedly improved performance by neutralising the effects of accumulating lactic acid. However, a more contemporary view suggests that the sodium bicarbonate improves the muscle's ability to retain potassium which promotes continued high power production.

Clearly, lactic acid may not be the single cause of fatigue during sprint exercise. But can the body derive any benefit from the lactate produced from lactic acid? Up to 25% of the lactate we produce is reconverted to glycogen (storage form of carbohydrate) in the muscle after exercise. What this means is that in recovery, we are able to regain some of our glycogen stores, ready for the next session of exercise. Remaking glycogen from lactate can therefore benefit those athletes involved in tournaments or those who compete in qualifying heats throughout a lengthy competition.

Finally, for the possible interest of endurance athletes, lactate plays an amazing rescue role in the latter stages of prolonged exercise when muscle glycogen begins to run low. I mentioned earlier that lactate is usually produced in anaerobic conditions. However, adrenalin will also cause lactate production - even in aerobic conditions. This is important because glycogen depletion (the universal fear of all endurance athletes) is confined almost exclusively to those muscles which have been exercised. For example, when a marathon runner hits the wall, there are still ample reserves of glycogen in his/her arm muscles. The problem is this: how can the leg muscles gain access to the precious glycogen still in relative abundance in non-exercising muscles? Adrenalin provides the means!

Adrenalin levels rise as exercise duration continues; in the presence of adrenalin, non-exercising muscles produce lactate. This lactate is transported to the liver which converts the lactate to glucose and releases it back to the blood, making it available to the exercising muscles! Thus, carbohydrate (in the form of lactate then glucose) is shuttled from non-exercising muscles to those muscles which the athlete is using to maintain exercise. Principle players in this process are adrenalin (for producing the lactate) and the liver (for converting the lactate to glucose).

So in summary, lactate is but one of several 'suspects' implicated in the fatigue process during sprint exercise. For the endurance athlete, lactate provides the means of accessing precious glycogen molecules stored throughout the body. As scientific techniques improve, the role of lactate in fatigue will become clearer; we'll keep you informed of events as they develop!

From the Research

Endurance training and age

Historically, we were always told that older people can't respond to endurance training as well as youngsters. However, recent sports science research is telling us a different story. A study at the University of Florida examined 10 older men and women with an average age of 67 years and compared their response to 16 weeks of endurance training with 11 whippersnappers aged 30 years.

Each of the 21 subjects worked out three times per week on a treadmill and/or stair-climbing machine. The training program was progressive with training time increasing from 20 to 40 minutes and intensity increasing from 60 to 80 percent of maximal heart rate.

After 16 weeks the 30 year-old youngsters had increased their aerobic capacity (VO_2max) by 12 percent while the older group had improved by 14 percent. These results strongly support the current view that when training stimulus is similar, that older people can increase their aerobic capacity just as much as young people.

Did you know?

King of the English Channel	Mike Read (England) 31 crossin
Queens of the English Channel	Alison Streeter (England) 27 crossings
Fastest Person	Chad Hundeby (US) 7:17 (1994)
Fastest Woman	Penny Lee Dean(US) 7:40 (1978)
Oldest Man	Clifford Batt (Aust) 18:48 (1989) 67 yrs 240 days
Oldest Woman	Susan Fraenkel (S. Afr.) 12:05 (1994) 46 yrs 103 days
Youngest Person	Thomas Gregory (Eng.) 11:54 (1988) 11 yrs 11 months
Youngest Girl	Samantha Druce (Eng.) 15:27 (1983) 12 yrs 118 days
Longest Time (solo)	Henry Sullivan (US) 26:50 (1923)

Masters Athletes and Prescription Drugs

by Dr Terry Farquharson

One of the unfortunate consequences of aging in modern society is that many of us are now using prescribed drugs for many of the lifestyle diseases associated with aging. As a sports physician with an interest in masters sport, I was keen to know how prevalent the use of such drugs was in masters sport. A survey was the answer. At the Second Australian Masters Games held in Adelaide in 1989, we found that 25 percent of the 4000 participants were using prescribed drugs. The most common drugs used by the Adelaide athletes were cardiovascular (9%), respiratory (4%), and non-steroidal anti-inflammatories (4%).

Cardiovascular drugs

■ Of the cardiovascular drugs used by the masters athletes, beta-blockers (for blood pressure and other heart disorders) and diuretics (fluid tablets) were the most commonly used. Interestingly, many of the rifle shooters (10%) were using beta-blockers which have the effect of slowing heart rate and controlling stress-induced tremor. This would obviously place athletes such as shooters, archers, divers, and pentathletes at an advantage. This is the reason the International Olympic Committee (IOC) banned such drugs in 1988 but in 1993 limited the ban to only those sports such as those listed above where the athletes were likely to benefit. Beta-blockers in endurance athletes cause weariness and decreased aerobic capacity by reducing maximal heart rate, thus reducing endurance performance.

Terry Farquharson

Diuretics are also used to control blood pressure. These drugs increase fluid loss and have been used in sports such as boxing, judo and rowing to make weight. They are also used to aid in the urinary excretion of other drugs to avoid detection of these drugs and are also on the IOC banned list. Diuretics will produce a degree of dehydration and therefore can impair performance.

Respiratory drugs

■ The most common respiratory drugs in the Adelaide study were the aerosol sprays used in asthma. These included the bronchodilator drugs (Ventolin and Bricanyl) and the corticosteroids (Becotide and Pulmicort). These drugs are not banned when used in the aerosol form and have no effect on exercise performance. In the case of a travelling team or when training intensely, respiratory tract infections are common and may require an antibiotic. For example, at the Tenth World Veteran Games in 1993 held in Myazaki, Japan, 25% of medical consultations were for respiratory tract infections. Antibiotic therapy should not interfere with exercise capacity unless it produces nausea, abdominal pain or diarrhoea. However, if an infection requires an antibiotic, then the athlete is probably not fit to train hard or compete.

Non-steroidal anti-inflammatory drugs (NSAIDS)

■ NSAIDS include Naprosyn, Voltaren, Feldene, Brufen, Indocid, Orudis, Tilcotil, Surgam, Clinoral and Dolobid and are used in the treatment of acute and chronic soft tissue injuries such as sprains and strains and arthritic conditions. Common side effects are gastro-intestinal which can be minimised by taking the drugs with food. There is no IOC restriction on their usage.

Hormone Replacement Therapy

■ Recently, the performance-enhancing drug testosterone has become an accepted part of Hormone Replacement Therapy to manage symptoms associated with the female menopause. Testosterone, the naturally occurring male hormone, produces increases in muscle strength and is banned by the IOC. Wendy Ey, the high profile Veteran track athlete from South Australia has become somewhat of a crusader in Australia in an effort to convince the powers that be that it should be allowed for use by veteran female athletes when prescribed in physiological doses for legitimate medical reasons.

Drug	*Use*	*Side Effect*	*Effect on Performance*	*IOC banned drug*
Beta blockers	Hypertension, heart disease	Lethargy, fatigue, insomnia, dreams cold hands and feet, aggravation of asthma.	Reduced aerobic endurance Improved hand steadiness	Yes (archery, shooting, bobsleigh, diving, biathlon, modern pentathlon, ski jumping)
Diuretics	Hypertension, heart failure	Dehydration, muscle cramps, aggravation of diabetes and gout.	Reduced if dehydration occurs	Yes
Inhaled bronchodilators	Asthma	Tremor, anxiety, palpitations	Nil	No
Inhaled corticosteroids	Asthma	Oral thrush	Nil	No
Antibiotics	Infections	Nausea, diarrhoea,	Nil	No
NSAIDS	Arthritis, strains, sprains	Nausea, diarrhoea, abdominal pain	Nil	No
Testosterone	Hormone replacement therapy	Masculinising effects	Improved strength	Yes

Overview

■ In relation to masters sport, use of certain drugs must not interfere with performance nor cause undesirable side effects. Bans by official bodies such as the IOC or Masters Games organizers also need to be considered. The table above summarises the uses, side effects, effects on performance and IOC bans on the commonly prescribed drugs cited above.

Unfortunately as we age, drug use is associated with a greater incidence of side effects due to a greater sensitivity to their effects, a reduced ability to excrete them and because more drugs are prescribed to us. During exercise 70% of energy produced is converted to heat. A normal body temperature is maintained by loss of heat, mainly by evaporation of sweat. Many commonly used 'over the counter' and prescription drugs can alter the ability to lose heat. This may cause overheating which will be greater if the athlete is suffering from a 'viral' illness or has a fever prior to undertaking physical activity.

Finally, the question of drug testing of veteran athletes taking prescription medication is rearing its head. Recently, the Australian Sports Drug Agency (ASDA) was established to provide a drug testing program for Australian elite young athletes and to act as an educational source. For veteran sports, it can be difficult to distinguish between the legitimate use of prescribed drugs and their use to enhance performance. Ultimately the final decision concerning drug use or testing rests with the relevant National Masters Sporting Organisation concerned or the Masters Games organizers. Drug testing was to have been carried out at the World Veteran Games in Turku, Finland in 1991 and in Myazaki, Japan in 1993 but did not eventuate in either. It has been proposed that drug testing will be conducted at the World Veteran Athletics Championships in Buffalo this year. The organizers guidelines state that an athlete taking prescribed medication which is on the International Amateur Athletic Federation banned list is required to obtain a certificate signed by two doctors documenting the name and dosage of the drug(s) used. In general, it is important to continue any prescribed medication unless advised by a doctor to do otherwise. Further information concerning Drugs in Sport can be obtained on the ASDA Hotline 008-020506 or through their publication, the "Drugs in Sport Handbook". Be careful.

Athlete Profile

Name:
Bernard (Bernie) Hogan

Age:
74 years

Sports/Events:
Sprints 100 - 200 metres (track)

Occupations:
Past: Grazier/Land Development
Present: Retired

What do you enjoy about masters sport?
Keeping fit, meeting fellow athletes. Travel, competition, winning.

What motivates you to compete?
Ego, Bloody Ego. Will to win.

How do you keep yourself motivated?
Sport has become 'Way of Life' keep fit, helps my breathing - have emphysema.

Favourite training session:
When I am satisfied that I have worked 100% to my program. Whether it be a 70% effort or otherwise.

How often do you train?
5 - 6 days/wk

Person most admired and why:
Sir Charles Kingsford-Smith. He was a real trail blazer. The father of Australian air travel. I sold daily papers to Sir Charles in the 1930's.

Other interests/hobbies:
Stamp Collecting. Coaching Veteran athletes.

Highest achievement:
Running 55 - 59 age group world record of 11.5 secs, Jo'burg, South Africa 1976.

Most memorable moment in sport:
Winning World Championship 100 - 200 in Sweden 1977, Germany 1979, Christchurch 1981, Puerto Rico 1983, Turku Finland 1991, Japan 1993

Favourite movie:
On Sprinting

Favourite book:
On Sprinting

Favourite 'bad' foods:
Take aways

Favourite 'good' foods:
Old style roast dinners, light breakfast, fruit &/or cereal

Philosophy on life:
Good, better, best, never let it rest, until your good is better and your better best.

Advice to masters athletes wanting to improve:
If you have been out of sport for many years, you must be prepared to come back slowly. Aim to reach your peak in about two years.

Other Comments:
It has been very difficult to be MODEST. OH WHAT AN EGO.

Training for the Veteran Distance Runner

by Pat Clohessy

Personal training for the masters distance runner depends largely on their background, their other interests and commitments and their motivation. I see distance running training as having an emphasis or priority on enjoyment and group training. This gives the veteran runner a better chance of retaining an interest in an activity which may be pursued for years.

The important components of the distance training program which I wish to present to you are:

1. Group training
2. Long running
3. Recovery running
4. Races
5. Speed
6. Rest

I believe **Group training** is an important ingredient in the distance runners program. Social benefits compliment the obvious training advantage of running with a group and often promotes regularity, continuity and enjoyment. The many examples of the importance and influence of group training give credence to this. In the ACT there are regular group runs which attract a range of abilities and consequently some run longer distances while others jog shorter courses. Apart from the standard Sunday morning group runs - often led by club President Bryan Thomas - there are regular Tuesday morning group runs for those available. Such group training is instrumental in the great success of the ACT Vets.

Long running is a critical factor in training for distance from 1500 metres to the marathon. This is well illustrated by reference to the extraordinary results of legendary New Zealand coach Arthur Lydiard at the Rome Olympics when his pupils nurtured on long runs won gold medals at 800m, 5000m and bronze in the marathon. Even 800m champion, Peter Snell ran the regular Sunday morning long run over 22 miles through the Auckland hills - with the Lydiard group. Remember though that a long run may be 50 minutes or one hour with the duration of the run depending on your background and development. I regard any distance from 50 minutes as a long run. In time you may build up to 90 minutes when you have absorbed the shorter runs.


Pat Clohessy

Complementary to long running is the role of **recovery running**. Properly used, this has a regeneration and relaxation effect. I believe this is the critical nexus in the long term success of a training program. Recovery running is also very helpful in the prevention of injury. Recovery runs are simply easy relaxed runs of 25 minutes to 35 minutes slotted into a weekly schedule twice a week. Even for elite runners I advocate such runs. I believe this is a reason why standouts like Rob de Castella and Steve Moneghetti have enjoyed long, successful and uninjured careers.

Varied racing is another ingredient in the training pattern for the Veteran athlete. Because we all need a goal to give added interest and purpose to our training, I advise regular races. Graded races, handicap runs, cross country runs, fun runs and in track season runs over a range of distances from short distances up provide such purpose and enjoyment - provided you have had those recovery runs. You will probably look forward to your strong runs at competition time when you have trained in the relaxed manner above.

Speed work. I have deliberately given this a lower priority because excessive speed work, especially repetitive high intensity running, is the principle reason for injury. I put an emphasis on avoiding injury, especially in the case of the Veteran athlete. However, I do advocate optional sessions such as six by 30 seconds which can be incorporated into a 40 minute training run preferably on grass or trail.

Finally, remember to include a **rest** day or two each week! Enjoy this new publication and keep running!

Deep Water Running

by Peter Reaburn

How can we run in deep water without touching the pool bottom? Why would I want to? The answers are that running in deep water can be done through wearing a device such as a water vest or belt. Running with these devices not only makes us stronger but also reduces the risk of injury we might face when working out on the road. It is also a great way for an athlete to rehabilitate from an injury to the lower limbs. Indeed many of the injured Brisbane "Bears" AFL players are often seen down at the Queensland University pool working out.

A water vest or belt is designed to allow an athlete to simulate the running action in deep water. The vest provides enough buoyancy to keep your head above the water, keeps the spine in a vertical position, and allows the arms and legs to run naturally without causing skin irritation.

Interval training, fartlek, tempo running, long, slow distance, or sprint work can be done to help the masters athlete attain that PB or train while injured. It is also a great way to "cross-train" where the aim is to use different muscles in a different manner to that done in your primary activity. Deep water running is also a great way to recover from those hard interval sessions or races. It reduces the pounding effect of gravity as we run but provides a resistance so that we can get a workout. This means we don't get those trauma-causing forces of running but the extra resistance of the water is 12-45 times that of air, depending on how fast we water-run. This means that we can increase strength and endurance of the running muscles without the pounding.

I would strongly recommend such devices for the older athlete that suffers injuries regularly or has trouble recovering from hard workouts. These devices are becoming increasingly available for hire at pools but are commercially available. One word of advice if you choose to use your heart rate as a guide to deep water training intensity - the heart rate will usually be 10-20 beats lower due to the pressure of the water helping maintain blood return to the heart. Enjoy a change of training mode or give it a go if you are frustrated by recurring injuries - you'll be surprised at the results!

Book Review

Levy, A.M. & Fuerst, M.L. (1993). ***Sports Injury Handbook: Professional advice for amateur athletes.*** **John Wiley & Sons, Brisbane. RRP $34-95.**

The Sports Injury Handbook is one of the most easily read and understood books in its field. Its strength lies in the layout - double columns, its extensive use of diagrams - illustrative and well explained, and its logical breakdown into chapters on both specific body parts (e.g. knee, elbow) and specific sports. For the busy masters athlete who wants a quick answer to a niggling injury, they simply look up one of the over 30 sports and read the 10 or so pages on that sport. Those pages will cover all the common injuries in the sport - their symptoms, their treatment, and more importantly, their prevention. There are well-diagrammed chapters covering warm-up / warmdown stretches and strength-training exercises that are aimed at injury prevention. The comprehensive book also has a detailed chapter on eating to win and even devotes a chapter to the unique requirements of both the female athlete and us, the older athlete. The Sports Injury Handbook would make a welcome addition to those masters athletes with an interest in sports medicine.

From the Research

Weight training and age

Sports scientists have recently discovered that masters athletes respond in the weights room just as effectively as younger athletes. However, a recent study in Canada has suggested that the time span of the adaptive changes may be longer in older athletes compared to the younger athlete.

Ten elderly women (average age 81 years) participated in an eight-week program designed to strengthen their quadriceps muscles. The women worked out three times per week using three sets of 10 repetitions of knee extensions (knee straightening).

Studies on younger people have suggested that muscle power improves fairly rapidly during the first few weeks of training due to improved co-ordination of the nervous system. This phase is normally followed by more strength improvements as muscle size increases. However, in the Canadian study, the masters athletes failed to improve strength during the first four weeks of their program but blossomed during the last four weeks of the eight-week program with muscle strength improving a whopping 61 percent.

Thus it appears that older athletes respond well to strength training but that the training response may be slower than that observed in younger athletes. So, if you are taking our strong advice and undertaking strength training, don't be disheartened if you don't see changes in the first few weeks, they will happen. To use a well-known saying from a shampoo advertisement: "It might not happen overnight, but it will happen!"

VicHealth 5th Australian Masters Games

Melbourne 5 - 14 October 1995

Entry is now open for the VicHealth 5th Australian Masters Games, to be staged in Melbourne from 5 to 14 October this year.

A total of 53 sports will take part in the Games, with competition taking place at over 90 venues located throughout Melbourne and surrounding areas.

The Games are open to anyone aged generally over 30 (younger in some sports, older in others) and most sports have no affiliation requirements.

One of the aims of the VicHealth 5th Australian Masters Games is to promote the benefits of regular physical activity, through the adoption of the 'Active For Life' health message.

Entry details are available from the Games office on (03) 666 4214. Official close of entry is 1 August 1995.

Heart Rate Monitoring in Masters Rowers

by Tim Kerrison

Regardless of our age or the level we want to compete at, we all want to make the most of the time we spend training. Monitoring heart rates while training will help us achieve this. As training intensity increases, our heart also increases. If we don't train hard enough we won't get the desired training benefits. Similarly, if we train too hard our heart rate will be too high, and we will be unable to maintain the intensity for as long as we should.

There are a variety of methods that can be used to determine the minimum and maximum heart rates at which we should train - these are called **training thresholds.** We will refer to these as the aerobic and anaerobic thresholds.

The aerobic **threshold** is the minimum intensity at which we must row to become aerobically fitter. Improvements in technique and fat loss may be best achieved training at intensities *below* the aerobic threshold.

If we gradually increase our training intensity (increase rating or blade pressure) we will reach a point when we can't maintain that intensity for a prolonged period. This is referred to as the **anaerobic threshold**. By training at heart rates between the aerobic and anaerobic thresholds we are able to continue rowing for prolonged periods. You may have heard this type of work referred to in rowing circles as utilization work (or U1 & U2). Rowing in this zone will make the heart and lungs more efficient at supplying oxygen to the muscles, and the muscles get better at extracting oxygen from the blood.

Training at a heart rate at or near anaerobic threshold is called 'threshold work' or 'AnT work'. This training zone can generally be specified as two beats per minute either side of the anaerobic threshold. For example, if your anaerobic threshold is 150 beats per minute, then a zone of 148-152 will be your anaerobic threshold zone. Rowers can generally maintain this intensity for 20-30 minutes. 'Threshold work' might include repeated intervals of 1-15 minutes with rest intervals of about half to two-thirds the duration of the piece. An 'AnT' session might be 3 x 12-minute pieces with 8 minutes easy recovery, or 20 x 1 minute pieces with 40 seconds easy row recovery. Care should be taken when doing shorter work efforts (e.g. 60 seconds) to ensure that these efforts do not exceed the anaerobic threshold intensity (i.e. they should not be flat out sprints). Keep an eye on your heart rates!!

Training in this zone will lead to an increase in the anaerobic threshold, therefore allowing us to train at a higher intensity for longer periods. This is a critical adaptation for rowers. When we work above the anaerobic threshold (e.g. in a 1000m rowing race) our muscles start to accumulate lactic acid. Lactic acid causes our blood and muscles to become acidic and causes the pain that will eventually force us to slow rating or drop pressure. Increasing the anaerobic threshold will allow us to race at a higher intensity. The sad truth is that it's never going to hurt less, but we will go faster for the same amount of pain!

When training at heart rates above the anaerobic threshold the heart cannot pump enough blood to the muscles to meet their need for oxygen. This type of training is termed anaerobic (i.e. without air), and conditions the muscles to function without oxygen. This teaches the body to neutralise and remove lactic acid.

As masters rowers generally race over 1000m, more high intensity work should be used than that of the youngsters who race over 2000m. However, sufficient recovery of at least 48 hours is recommended between sessions with a utilisation session between hard sessions enhancing recovery.

The type of training we do will depend on the time of year. Generally the off-season should include mainly utilisation work to build a strong aerobic base and refine technique. As the competition season approaches the volume of high intensity work should gradually increase at the expense of the utilisation work. If you don't have a coach, as is the case with most masters rowers, then ask a level 11 accredited coach from your club or district to write you a program that incorporates the different training zones mentioned above.

> THE SAD TRUTH IS THAT IT'S NEVER GOING TO HURT LESS, BUT WE WILL GO FASTER FOR THE SAME AMOUNT OF PAIN!

Determining Your Training Zones

■ There are several ways to determine your heart rate training zones ranging from the simple to the complex.

One of the simplest ways to estimate your training zones is by using a percentage of your maximum heart rate. Maximum heart rate can be estimated from 220-age. However, ideally it should be determined within an exercise laboratory at a Sports Institute or University. Another way is to do say 10 x 1 minute pieces on an ergo - with the rating and pressure increasing each piece till max. This can be a dangerous practice if you are a novice at high intensity work and should be done with someone around. It should always be done after a good warm-up and be followed by a warm-down. A heart rate monitor should be used. Aerobic threshold is 70-75% of maximum and the anaerobic threshold 85-90% of maximum heart rate.

A more complex method is to go to a testing facility and be tested by an exercise physiologist. These accurate tests use a number of increasing intensity 3-5 minute pieces on an ergo and involve blood lactate analysis. Such tests also enable you to monitor your progress by assessing improvements on follow-up tests.

Measuring Heart Rate

■ There are a number of ways in which heart rate can be measure while training. The easiest is to take your pulse for 15 seconds and multiply by four. Although this is simple and requires nothing other than a watch with a second hand, it does require that you stop rowing. This can make it quite difficult to monitor heart rates throughout a session or during a piece.

Heart rate monitors are now commonly used to monitor heart rates and do not require that you stop exercising. These devices consist of a transmitter that straps around your chest and a receiver that looks like a wrist watch. Some models allow you to program an alarm to go off if you are not in your target zone. Some models can even be downloaded to a computer to give you a complete analysis of your heart rate responses to your training.

Other Considerations

■ One thing to be aware of when using heart rates is a phenomenon called 'cardiovacular drift' or 'heart rate drift'. This is when the heart rate slowly starts to creep up even though you are maintaining the same intensity. This often occurs towards the end of a long session. Heart rate drift is caused largely by dehydration so make sure you take out plenty of water with you on those long rows, especially in hot, humid climates.

Rowers know what a satisfying sport it can be, but when we can't see any obvious signs of improvement it can be discouraging. Monitoring heart rates is one way we can make sure we keep on improving, plus it gives us a means by which improvements can be gauged.

> *"Grow old along with me!*
> *The best is yet to be."*
> **(Robert Browning)**

Get Strong - Get Fast

by Dr. Peter Reaburn

All of us want to get faster - whether it's to win a medal at a major meet or to just crack that 60-second PB barrier for the 50 free. If you have tried all kinds of in-pool training to achieve these goals and never quite made it, there is a secret way - resistance training. In fact, gone are the days when strength training can be ignored for the masters athlete who wants to sprint faster.

What the research says

Dr. Peter Reaburn

■ Research in our own and numerous other laboratories have conclusively shown that aging means decreases in both strength and muscle mass. Both these factors are critical for speed - whether it be in the pool or on the track. So the answer to improving these factors is strength training. In young swimmers, a 1988 study reported improvements of 0.04-0.08 m/sec (0.5-1.00 seconds) over 50 meter freestyle after a resistance training program. The same swimmers reduced the number of strokes per minute by two strokes and improved their stroke length by 12.5 cms, both these changes strongly suggesting increased force on the water. In veteran sprint runners, we recently undertook an eight-week strength training study on 12 males and 10 females. We measured strength, thigh muscle size, and both 100m and 300 meter speed on the running track before and after a strength training program. In the men we observed a 100% increase in strength and increased thigh muscle size. In the women sprinters, we observed up to 150% increases in strength but no increase in thigh muscle size. Importantly for both the male and female vets, both 100m and 300m speed improved significantly, despite no change in track training over the eight week period. While this study was on track runners, the results are important for masters swimmers. Being stronger gets us faster.

What does strength training do?

■ Historically, we believed that strength increases occurred simply because muscles got bigger with strength training. While this is a major adaptation, we now know that the nervous system is a major player in strength training adaptations. The nervous system adapts by contracting the muscles more forcefully and in a more co-ordinated fashion. Research has shown that strength training in older people leads to significant changes in the nervous system and smaller changes in muscle size. These changes in muscle size can vary enormously between individuals. A 1979 study showed that the range of increases in muscle size in younger people after a resistance training program was 3-49%. Most men and women do not need to worry about increased muscle size because they will not possess the genetic predisposition to bulk up. In fact, given that older athletes appear to lose muscle size as they age, any increase in muscle size as a result of strength training may help delay this age-related decrease in muscle size and strength.

Joint or body parts	*Exercises*
Shoulder	Latissimus pulldown in front and behind the neck, upright rows, bent-over rowing, seated rows, straight- arm pullovers, bent-arm pullovers, bench press, chins, incline bench press, decline bench press, pulleys, shrugs, lying lateral raises, side pulleys.
Upper arm	Biceps curls, triceps extensions
Forearms	Wrist curls
Lower back	Back extensions, dead lifts
Abdomen	Sit-ups and side twists
Hips and knees	Leg presses, half-squats, leg curls, leg extensions
Ankles	Calf raises
Adductors (inner thigh)	Adductor pulleys, adductor machine.

Strength Training Procedures

■ All strength training should be based on the principle of progressive overload. That is, to get stronger the muscles must be overloaded with more resistance (weight) so that strength will increase even more. Most studies have shown that 4-8 repetitions for 3 or more sets is optimal for strength development. However, programs with up to 12-15 repetitions have also been effective. Recovery between sets should be between 2 and 3 minutes. However, more than any other factor, the resistance or weight creates the overload on the muscles. For strength development, the resistance should be between 70 and 90% of the resistance or weight that can be moved once. For power (force / time), the most important component in sprinting, the resistance should be between 30 and 60% of maximum strength. Most experts agree that two to three days per week is optimal for strength development with one day per week for strength maintenance.

Strength Training Exercises

■ The exercises that should be performed are those that work the major muscle groups that swimmers use to propel themselves through the water. The exercises should also mimic the swim action or strengthen muscles involved in preventing injuries in swimmers. The table above outlines those major muscle groups and the exercises suggested for those muscle groups.

The exercises in a strength program should be changed every 3-4 weeks to discourage plateaus in strength. A good strength program should move from general and non-specific strength through specific strength to specific stroke power. For younger (<45 years), the following plan might be used:

General strength
and preparation ..... 2-4 weeks
Strength development ..... 3-12 weeks
Power development ..... 3-6 weeks

Recent research on older (>45 years) people has suggested that these time periods might be extended slightly as older people appear to take longer to adapt to strength training. While the above exercises can be used in the first two phases above, the third period can include in-water resistance (tethered swimming, bands), swim benches, or pulleys. The exercises during phase 3 should be at, near, or above actual pool stroke rates. The gym exercises should also be adjusted. Resistance should be lowered, repetitions increased to 10-20 per set, sets maintained at 3-6, but work periods be reduced to 5-15 seconds with speed per repetition increased.

Conclusion

■ There is no doubt in my mind that the older we become, the more important strength training becomes to maintain or develop speed in the masters swimmer. While the above discussion is aimed at giving the reader the ability to develop a strength training program of their own, I STRONGLY recommend that you contact a resistance training specialist to fine tune your program and show you safe resistance training technique. Speak to a swim coach at your pool - they may be able to put you onto such a person. If not, an organization called the Australian Strength and Conditioning Association have accredited strength and conditioning personnel - their state association in the capital city phone books may be able to help you. Train strong, develop power, race fast.

Improve your Individual Time Trialing (Part A)

by Liz Hepple

Part 1 of a 2 part series on how to improve your cycling 'Individual Time Trial'. It explains what elements can be incorporated into your training to help you speed up your time-trial. Triathletes will also find this information useful.

Liz Hepple

Some people love them, others dread them, but all cyclists have to admit that an individual time trial is a 'race of truth'. This is where you find out just how fast (or unfortunately, how slow) you are. No wheels to sit behind - just you, your machine and miles of bitumen to cover in as short a time as possible. While a time trial lacks the excitement and unpredictability of road racing, it is a huge mental and physical challenge to push yourself to the maximum you can sustain for the entire distance of the event.

The mystery of time trialing is that even some of the best road riders just can't seem to do a good time trial. The reason for this is complex - a combination of psychological, physiological and of course aerodynamic factors. Physiologically, some riders simply do not have the right sort of fitness to do a time trial, or perhaps they lack the strength to push a big enough gear to be successful. Psychologically, some riders are just unable to focus on the 'closed' skill of time trialing - they're too busy looking at the scenery, or thinking about what they're going to do on Saturday night, or simply how much they hate time trialing.

The good news is that it is possible to improve your individual time trial. Of course, a new ultra-light aerodynamic time-trial bike with carbon fibre four-spoked wheels would probably help - but you can actually do it without spending bucketloads of money. There's no guarantee that you'll become the best in Australia, but certainly you can do the best that you are capable of - and that's what your sport is all about -right? So what are the secrets of doing a good time trial.

1. Strength

■ Time trialing requires good strength to drive the pedals over, particularly in those big gluteal muscles in your posterior. Out on the road there are often strong head and cross winds, and rough surfaces that require a bit of brute strength to overcome. A great way to increase your strength is by introducing some weight training into your early season program, and then maintaining this through the racing season.

Good 'free weight' exercises for increasing gluteal and general leg strength are **squats, power cleans** and **lunges.** If you use machine weights, **leg presses** and **hip extensions** are the best. The number of repetitions you do will vary depending on fitness and past experience, but generally you should include about 3 sets of 8 - 12 reps of two or more of the above exercises. **Leg curls** should also be performed to strengthen your hamstrings as well as doing some general upper body exercises. It is important to see a weights consultant to get an individual program and to learn to do the exercises correctly. Faulty weight training technique can cause unnecessary injuries which are a pain in the neck, not to mention the knees and back. A visit to specialist is money well spent.

Strength can also be improved by including some **Strength Endurance** training into your pre-season training. This involves climbing long gradual hills (between 5 and 15 kms long if possible) in the saddle in a bigger gear than you would normally use (50 - 55 rpm). But, beware - don't do this if you are a novice. Even experienced riders should gradually incorporate this into their training. If you do too much 'big gear' work too soon, you'll end up with sore knees. If you don't have access to long hills, just ride every hill on your training circuit in this manner. Only do these sort of efforts once or twice a week, and do them for about 6 - 8 weeks in your early season training.

2. Fitness Training

■ Have a look at the sort of training you're doing. If you train by sitting behind other riders in a bunch, you will have problems when it comes to having to push into the wind yourself. So, even if you thrive on the social side of bike riding, try and set aside a couple of days a week for individual training.

This training should include certain 'intervals' which will improve your time trial, and these focus on working at or above your anaerobic threshold (E3) for varying periods of time. *(The determination of your anaerobic threshold is another topic altogether. See description of E1-4 intensities below)*

The table below shows some intervals (or efforts) that could be included in a training program for riders wishing to do a 40 km time trial in six weeks time. These sessions can be done with a partner of similar ability riding beside you, which brings out the competitive spirit. If you have a stationary bike, you could do these intervals on it - except reduce them to minutes instead of kilometres.

3. Technique

■ Remember that practise only makes perfect if your practise **is** perfect. During your efforts you should concentrate on a smooth, circular pedalling motion. Make sure your hips don't rock from side to side, and keep your shoulders and upper back relaxed. Use time trial bars if possible whenever you are doing this sort of training.

(Part B of 'Improving your Time Trial' will be incorporated in the next issue of THE MASTERS ATHLETE and will explain how to impro[illegible] mental approach to this event, and what t[illegible] race day.)

Major Masters Cycling Dates

August 24-27
UCI Veteran Challenge - Road
St Johann, Austria (#)

August 31-4/9
World Cup - Track
Minneapolis, USA. (#)

Sept 8-10
UCI Veteran Challenge - Track
Manchester, England (#)

Sept 16-23
Oceania Cycling Championships
Townsville, QLD (%)
-Track, Road, MTB

Sept 17-24
UCI Veteran Challenge
Kirchzarten, Germany (#)
-Mountain Bike

October 5-14
Australian Masters Games
Melbourne, VIC (*)

Key:
(#) Contact ACF (02) 281 8688
(%) Contact QCA (07) 390 1489
(*) Contact VCI (03) 328 4391

Intensity		*Effort*	*Approx. Gear*	*Approx. Heart Rate*
E1	=	Easy	42/18 - 21	55 - 65% of Max.
E2	=	Tempo	52/17 or 18	65 - 85% of Max.
E3	=	Hard	52/15 or 16	85 - 92% of Max.
E4	=	Very Hard	52/13 to 15	93 - 100% of Max.

WEEK 1 Tues: 60 - 80 kms. Include 40 kms E2
Thur: 60 - 80 kms. Include 4 x 5 kms E3
(Do 5 kms E1 between intervals)

WEEK 2 Tues: 60 - 80 kms. Include 20 kms E2 and 2 x 10 kms E3.
(Do 5 kms E1 between intervals)
Thur: 60 - 80 kms. Include 3 x 5 kms E3 and 3 x 2 kms E4.
(Do 5 kms E1 between intervals)

WEEK 3 Tues: 60 - 80 kms. Include 40 kms E2
Thur: 60 - 80 kms. Include 10 x 2 kms E4.
(1km E1 between intervals)

WEEK 4 Tues: 60 - 80 kms. Include 3 x 10 kms E3.
(5 kms E1 between intervals)
Thur:60 - 80 kms. Include 2 x 5 kms E4.
(5 kms E1 between intervals) and 5 x 2 kms E4 (1km E1 between)

WEEK 5 Tues: 60 - 80 kms. Include 2 x 20 kms E3.
(5 kms E1 between)
Thur: 60 - 80 kms. Include 4 x 5 kms E4.
(3 kms E1 between)

WEEK 6 Tues: 60 - 80 kms. Include 4 x 5 kms E3.
(5 kms E1 between)
Thur: 60 - 80 kms. Include 4 x 2 kms E3.
(5 kms E1 between)
Sunday RACE DAY

Strength Training for Triathlon

by Greg Reddan

Strength and the Mature Athlete

■ For most of us, maximal strength is achieved between 25 and 35 years of age, followed by a gradual decline with age. The cause for this strength decline is mainly a decrease in muscle mass that occurs with aging. This loss of muscle mass may be due to either a loss in the number of muscle fibres or a decrease in the size of each fibre. Research suggests that there is a selective loss of the fast-twitch fibres, resulting in a decrease in muscular strength and power. The other bad news is aging also affects the nerves that influence muscular strength due to the speed of the nerve signal to the muscle decreasing. Aging muscle is also less excitable and needs a greater stimulus for contraction. Sound familiar?

Benefits of Strength Training

■ Many master's triathletes feel they have insufficient time for weight training but should l[illegible]at the advantages a strength program can provide. These benefits include greater strength (to push on the cranks, press on the water, or toe-off the ground) due to increased muscle size and more nervous stimulation. Other benefits are stronger tendons and ligaments for injury prevention, and increased bone density.

Looking at the benefits of weight training we would be foolish not to include it in our training programs. A concern of many triathletes is the build-up of extra muscle mass might hinder performance, particularly in running. However, muscle bulk can be avoided with a program of higher repetitions and lighter weight. Dave Scott, who has won the Hawaiian Ironman six times and finished a close second to Greg Welch at age 40 last year, is a firm advocate of weight training. Scott found that you can increase your strength and power greatly without building bulging muscles. He feels that upper body strength is very important in running in a triathlon to reduce th[illegible] muscular fatigue that occurs after the swim [illegible] bike. He believes that most people do not realize that cycling requires strength and endurance in the arm, abdominal, shoulder and back muscles. Thus, by strengthening these muscles, the cumulative fatigue will be reduced and you will be able to start the run fresher. This allows you to run with better form and quickly adapt to normal running rhythm and pace.

Weight Training for Triathlon

■ Triathlon involves considerable muscular endurance as opposed to strength. Therefore, our weight training programs should be designed to improve muscular endurance, resulting in an improved ability to generate more force over a longer period of time.

The obvious time to do this is in the off-season. The end of April sees the culmination of the Australian season and triathletes are entitled to a well-earned rest. We need about a month off to allow complete physiological and psychological recovery and no resistance training should be done at this time. However, by the start of June, most of us are itching to get started and can benefit greatly by following a program such as devised by Jerry Palmieri, a strength and conditioning coordinator at Kansas State University. His off-season program runs for four months from early June until the end of September and includes three phases.

Phase one is designed to increase strength and is performed four days per week using a split lower and upper body routine. Significant rest (2-3mins.) is taken between sets to generate maximum force for the required repetitions. Specific triathlon training volume is lower so more time is available to fit this into your program.

PHASE 1 (June-mid July - 7 weeks)
4 days/week

Monday/Thursday	Tuesday/Friday
Abdominal crunch 2 x 40	Bent knee situps 2 x 40
1. Leg press/squat	1. Bench press
2. Step-ups/lungs	2. Inclined bench
3. leg extensions leg curls	3. Shoulder: circuit - front raise 2 sets - lateral raise 2 sets - rear l. raise 2 sets
4. Glute-ham/hip extension Hip flexor	4. Biceps curl Overhead triceps extensions
5. Heel raise Lat. pulls	5. Plate runs 2 x 30-45 secs. Wrist curls

Phase two continues strength training with an increased emphasis on endurance. Training occurs three days per week with a lower and upper body split routine on two days and a circuit routine on the third day. Rest periods for the two split days are the same as phase one. The circuit is on a timed work-recovery system to promote greater muscular endurance. Specific conditioning is increased to moderate levels. We need to select exercises that duplicate the movements of swimming, cycling and running (e.g. squats rather than leg extensions).

Phase three is designed to peak muscular endurance. Strength training is done twice per week working both upper and lower body on both days. Recovery time between sets is no more that 45 seconds. Circuit training is not done due to an increase in specific conditioning.

The repetitions for the exercises (Table 1 over page) commence at 10 in Phase 1 decreasing to 6, whilst in Phase 2 they start at 8 and finish at 13, whereas in Phase 3 they increase from 15-20. As the repetitions decrease, the weight is increased and vice versa. The weight selected should be such that the last repetitions of the final set are difficult to perform. When all repetitions are performed in the final set, the weight must be increased. After completing these three phases, you will be able to generate more force over a longer period of time.


Greg Reddan

New Zealander John Hellemans, who coached Erin Baker to greatness, offers a different approach for the specific preparation and competition phase. Rather than weight training, strength training can easily be included into normal training sessions. It can be achieved by increasing resistance in each discipline. e.g. pull-buoy and paddles in swimming; cycling into a headwind, uphill, or with high resistance on a wind-trainer; or hill or sandhill running. Hellemans feels that weight training should never replace a swim, bike or run and thus it becomes a question of time available.

In summary, weight training is imperative in the pre-season phase of training and should be continued a minimum of twice per week in the specific preparation phase and at least once per week in the

PHASE 2 (Mid July - Late August - 6 weeks)
3 days/week

Monday	Tuesday
Crunches 2 x 50	Bent knee sit-ups
1. Step-ups/lunges	1. Bench press
2. Leg press/squat	2. Inclined bench
3. Leg extension Leg curls	3. Shoulder circuit - front raise 2 sets - lateral raise 2 sets - rear l. raise 2 sets
4. Glute-ham/hip extens. Hip flexor	4. Biceps curls Triceps Ext.
5. Heel raise lat. pulls	5. Plate runs 2 x 30-45 secs. Wrist curls

Thursday *(Circuit)*

1. Leg press/squat	8. Rear l. raise
2. Bench press	9. Leg curls
3. Step-ups/lunges	10. Hip flexor
4. Inclined bench	11. Biceps curls
5. Bent arm pullover	12. Heel raise
6. Lateral raise	13. Triceps ext.
7. Leg extensions	14. Plate runs

TABLE 1 Sets x Repetition cycle

Phase 1 Week	Phase 1 Sets/ Repetitions	Phase 2 Week	Phase 2 Set/ Repetition	Phase 3 Week	Phase 3 Sets/ Repetitions
1	3 x 10	1	3 x 8	1	3 x 15
2	3 x10	2/3	3 x 8	2	3 x 15
3	3 x 8	4	3 x 10	3	2 x 20
4	3 x 8	5	3 x 12	4	2 x 20
5	3 x 6	6	3 x 13		
6	3 x 6				
7	3 x 6				

Week	Circuit
1	2 sets of each exercise of 30 secs. with 15 secs rest 30 secs. to change stations
2/3	2 x 30 secs. work with 15 secs. rest and 30 secs. to change station
4	2 x 45 secs. work with 15 secs. rest and 30 secs. to change stations
5	2 x 45 secs. work with 15 secs. rest and 30 secs. to change stations
6	2 x 45 secs. work with 15 secs. rest and 30 secs. to change stations

Strength Training cont from Page 11

competition phase. I am sure we can find this extra time if we really want to improve those previous minutes (or seconds) to realize your full potential next season. Good luck - see you in the gym!

PHASE 3
(Early Sept- Early Oct. -4 weeks)
2 days/week

Monday
1. Leg press/ squat
2. Bench press
3. Leg extension Leg curls
4. Leg curls Hip flexor
5. Bent arm pull-overs
6. Lateral raise
7. Hip flexor
8. Biceps curls
9. Heel raise

Thursday
1. Bench press
2. Inclined bench
3. Leg extension - front raise 2 sets
4. Leg curls Overhead triceps extensions
5. Lat. pulls
6. Rear lateral raise
7. Glute-ham/hip extension
8. Overhead triceps extensions
9. Plate runs 2 x 90 secs.

Quotes

"The older I get, the better I WAS"
Author Unknown

"The old look to the young for style; the young look to the old for inspiration"
Author Unknown

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