Coaching & Training Adult Swimmers

Coaching Adult Swimmers
by John Ornsby
(Incl General Masters Swimming Information)

Introduction

Masters Swimming Australia is the national sports organisation/governing body for Masters Swimming, which is a not-for-profit organisation for adult swimmers aged 18 and above. Coaching adult swimmers is in many ways identical to coaching adolescent or age-group swimmers, but you will need to keep in mind some specific points when planning a Masters program. This section discusses these points and offers some possible solutions to situations you may encounter.

Masters Swimming Australia Overview

Who is Masters Swimming Australia?

It is a non-government, not for profit organisation, constituted in 1975. Masters Swimming Australia Inc. used to be referred to as “AUSSI”, which is an acronym for “Australian Union of Senior Swimmers International”. This acronym was dropped from the name in October 2009. The organisation does not receive funding from any government source; however, some Branches are eligible for and receive funding from State Governments.

Our Mission Statement

To provide at club, branch, and national level an environment that encourages all adults, regardless of ability, to swim regularly, to compete to promote fitness and improve their general wellbeing.

Our vision

Enrich and Inspire Adults to Swim for Life

Our motto

FITNESS, FRIENDSHIP and FUN

What does Masters Swimming Australia offer?

Masters Swimming Australia caters for those who can only just swim through to the experienced swimmer, emphasising participation in a fun and friendly environment which encourages and facilitates adult involvement in swimming. Only 30% of members compete in swim meets, so you don’t have to be a champion swimmer to join!

Who can join?

Membership is open to all people who have turned 18 or are older in the calendar year of joining.

Masters Swimming Australia National Office

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Barriers and motivation to exercise

Coaching adult swimmers is in many ways identical to coaching adolescent or age- group swimmers, but you need to keep in mind some specific points when planning a Masters program. We begin by looking at what motivates adult swimmers.

The best way to motivate adults is to enhance their reasons for attending (motivators) and decrease barriers to participation and/or performance. Coaches need to understand why their swimmers are attending, to plan a successful program strategy. The table below lists some barriers and motivators.

	Barriers	**Motivators**
Physical	Lack of transport Pain/mobility/fatigue Physical, vision or hearing impairment Lack of role model Poor instruction Cost	Symptom management Improved mobility Reduced risk of coronary heart disease, hypertension, obesity, osteoporosis Cardio-respiratory fitness
Psychological	Lack of family encouragement Attitudes and beliefs Perceived negative outcomes Difficulty sticking to a routine Negative body image Lack of confidence	Independence Feeling better Reducing stress Making exercise a priority Self-motivation Self-management (goal setting)
Social and Environmental	Fear of looking foolish Competing roles and responsibilities Lack of exercise programs	Having someone with whom to exercise Peer group acceptance Health care provider advice Access to exercise programs

Needs of the adult swimmer

A large aspect of adult learning is motivation. Consider these points when putting together your overall program strategy:

- *adults like social relationships* – to make new friends, to meet a need for associations and friendships
- *adults have external expectations* – to comply with instructions from the coach, to fulfil the expectations or recommendations of the coach
- *adults require personal advancement* – to achieve better swimming performances and stay abreast of competitors
- *adults need escape/stimulation* – to provide a break in the routine of home or work and provide a contrast to other exacting details of life
- *adults need a cognitive interest* – to learn for the sake of learning and to satisfy an inquiring mind
- *adults are people with years of experience and a wealth of information* – focus on the strengths they bring to a swim session, not just gaps in their knowledge
- *adults have established values, beliefs, and opinions* – demonstrate respect for differing value systems and lifestyles
- *adults are people whose style and pace of learning has probably changed* – use a variety of teaching strategies; most adults prefer methods other than a lecture
- *adults relate new information to previously learned information and experiences* – assess your swimmers' specific learning needs before the session or as it begins
- *adults have pride* – support the swimmers as individuals; allow people to admit confusion, ignorance, fears, and different opinions
- *adults have a deep need to be self-directing* – engage the swimmers in a process of mutual inquiry
- *individual differences among people increase with age* – use auditory, visual, tactile, and participatory teaching/coaching methods
- *adults tend to have a problem-centred orientation to learning* – adults generally want to immediately apply new information or skills

Differences between coaching age-group and adult swimmers

Adults, unlike children and adolescents, have many responsibilities they must balance against the demands of a training regime. Adults are also cautious, careful, have a desire to be perfect and have a lack of charity towards themselves.

As a Masters coach you need to vary your approach depending on the swimmers' reasons for training. They may be there for:

- *competition* – looking for a fully structured program with specific goals, e.g., event preparation, taper
- *fitness* – also looking for a fully structured program but with a sense of fun and willing to be flexible
- *social contacts* – looking for structure and a fun approach to training
- *recovery from injury/illness* – looking for an understanding of their condition and flexibility in your program

Some specific issues you need to handle differently with masters swimmers compared to age-groupers are:

- the wish to train but not compete
- communication with older swimmers
- discipline
- absence from training
- injury
- decline in competitive performance
- rules
- programming

The wish to train but not compete

Age-groupers
Some clubs provide a recreational/fitness lane for swimmers who want to train but not compete. Generally, parents support adolescents who enjoy swimming but have other equally important priorities.

Masters
Wishing to train but not compete is usually a request from new members and is commonly from a viewpoint of not wanting to fail in full view of family or other club members. New swimmers don't understand how Masters competitions work, usually have the incorrect view that state championships are for 'elite' swimmers, and don't identify themselves as such.

Possible ideas to increase participation in competition:

- provide club clothing or items such as swim caps as encouragement to identify with the club
- encourage participation at interclub competitions and provide club support and peer recognition
- suggest swimmers volunteer as timekeepers, relay organisers or club support at state championships
- explain the point score system at state championships and how participation assists club rankings
- organise post-competition events such as BBQs and dinners

Communication with older swimmers

Masters

Common communication issues with older swimmers include:

- *deafness* – if a swimmer cannot hear your instructions or details regarding group activity or new skills, position yourself so they can see you clearly, or write clearly on a hand-held notepad

- *poor eyesight* – if a swimmer cannot read the whiteboard with session instructions, you need to follow up with verbal instructions and explanations

- *lack of dexterity* – keep equipment nearby and allow extra time for swimmers to exit the pool for dives

- *overexertion* – older swimmers may overexert themselves, so make sure they fully understand what you are asking for in the session, and about post-training nutrition and hydration

Discipline

Age-groupers

The coach most commonly uses an authoritarian approach to group management.

Masters

With adult swimmers it is important to vary your approach to group management. Good interpersonal skills allow you to develop relationships with all your swimmers.

Be aware that there are some issues you need to handle differently with masters swimmers, for example:

- *arriving late for training* – advise what the swimmer should do to warm-up correctly and take a no-fault approach, as the reason for lateness will be valid

- *getting out early without warming down* – make suitable recommendations concerning muscle soreness, etc, as a swimmer's reasons for leaving early are also usually valid

- *not following your advice* – e.g., swimmers who change lanes or stroke to suit their personal agenda; you need to be able to discuss this and include their aims in your program

- *disagreements in training* – have squad etiquette and training guidelines in place and make sure everyone understands them

If you also train and compete with the club bear in mind you may be seen as a peer of the group. In this case you need to clarify when you are acting as 'the coach' and when in a social situation.

Absence from training

Age-groupers
Clubs usually have a formal squad structure where swimmers are required to attend a prescribed number of sessions per week. Permission is sought from the coach for any absence, and make-up sessions are organised if necessary.

Masters
Masters swimmers may let you know if they are going to be away from training for any period of time for holidays, time out, etc. They may also simply miss sessions through the week due to work commitments, family celebrations, children's school performances, sickness or bereavement, and there is very little you can do about this. Masters swimmers will get to training when they can and are aware of the cost of non-attendance.

Injury

Age-groupers
These swimmers' bodies are in the process of growing so coaches and medical practitioners need a good understanding of adolescent and pre-adolescent physio- logical development.

Masters
Advise swimmers to seek a medical opinion immediately any injury is brought to your attention. They are likely to heed your advice because you are a professional.

As a coach aiming to prevent injuries, advise your swimmers:
- to stretch as per current coaching guidelines (those swimmers who stretch regularly are usually recovering from an injury or have been instructed to by their medical professional)
- not to pack a weeks' worth of swimming into one session but to try to maintain a moderate level of activity through the week
- to perform with good technique, as using proper technique can reduce the risk of overuse injuries such as tendinitis and stress fractures

- to accept their body's limits, as they may not be able to perform at the same level as 10 or 20 years ago
- to increase their exercise level gradually

Decline in competitive performance

Age-groupers
A decline in performance is usually a psychological, time management or health issue in age-group swimmers and is managed by a coordinated approach with parents and coach.

Masters
A decline in performance in masters swimmers may also be psychological, time management or health related. Another major consideration with masters swimmers is the physiological effects of aging.

Rules

Age-groupers

FINA Rules	www.fina.org
Swimming Australia Rules	www.swimming.org.au

Masters

FINA Masters Rules	www.fina.org
Masters Swimming Australia General Rules	www.mastersswimming.org.au
Masters Swimming Australia Swimming Rules	www.mastersswimming.org.au

Programming

Age-groupers
Follow ASCTA and Swimming Australia Ltd (SAL) recommendations.

Masters
Use the ASCTA, SAL and Masters Swimming Australia recommendations as a guide and adapt for your group or club.

First, consider your swimmers interests/pursuits, such as:

- pool/fitness/competition
- open water
- surf lifesavers
- water polo
- triathlon

Adapt your programs to take into consideration the individual activities, competition schedules and goals of your swimmers. For example, a Masters swimmer who focuses on Masters Swimming competitions in the summer and then water polo in the winter needs a seasonal program to reflect this (see Unit 6: Planning for the Adult Swimmer).

Summary

To be an effective Masters swimming coach you need to understand the individual needs of your adult swimmers and work in partnership with them to increase motivation to swim and decrease barriers to participation and/or performance. These motivations and barriers vary from those of most age-group swimmers and may also vary significantly within your Masters squad. As a coach, you need to adapt your approach to cater for any issues that arise with adult swimmers on an individual basis.

Training the Adult Swimmer

Training Adult Swimmers
by Loren Bartley and Brad Thurlow

Introduction

A masters swimming coach must be able to organise, observe, analyse, communicate, and provide solutions and strategies to enable masters swimmers to improve their performance. To do this, the coach needs to know the how swimming training affects the many aspects of physiology that change with age, as these gradually diminish the body's ability to perform vigorous activity. This unit reviews the various aspects of physiological ageing and describes how regular physical exercise can slow these declines. The unit then gives you an overview of stretching techniques and why stretching is beneficial for Masters swimmers. Finally, the unit looks at the importance of inclusive coaching and ways of making the training environment accessible to persons of varying ability and disability.

Age related physiological declines

The relationship between ageing and performance is both good and bad. The bad news is that performance declines with age at the rate of about 1% per year after the age of 30. This is mainly due to the inevitable physiological declines associated with ageing. The good news is that exercise can slow down the decline in physiological functions, thus slowing the decline in performance as well. Scientific research supports anecdotal evidence that we have some control over the ageing process, making ageing appear to be more a result of a sedentary lifestyle than an inevitable decline in physical capacity.

Nobody can escape their genetic program. However, most people can do a great deal to minimise some of the physiological aspects of age-related declines by modest exercise programs which embrace conditioning in strength and flexibility, as well as the more commonly prescribed aerobic exercise. Swimming is an excellent mechanism for achieving this.

Circulatory declines

Ageing impairs the heart's ability to pump blood. Both maximum heart rate and maximum stroke volume (amount of blood pumped with each beat) decrease with age. This results in a lower maximum **cardiac output**. Although swimming doesn't affect maximum heart rate, it does increase heart size and therefore stroke volume and cardiac output.

cardiac output = heart rate x stroke volume

Maximum heart rate
The rule of thumb for predicting this is 220 minus the person's age. This is a rough estimate, as actual maximum heart rates may vary by plus or minus 20 beats per minute (bpm).

Maximum stroke volume

Maximum stroke volume decreases for two reasons:

- the walls of the heart stiffen so that it fills with blood more slowly
- elasticity of the major blood vessels decreases, reducing their rate of blood flow. Both changes increase the resistance to blood flowing from the heart into the arteries.

Respiratory declines

The maximum amount of oxygen that the body can consume during exercise is referred to as **VO2 max**. Physiologically it is the product of the amount of blood pumped by the heart (cardiac output) and the amount of oxygen that is taken from that blood as it passes through the tissues.

With increasing age and in the absence of regular exercise, individual alveoli increase in size and the number of pulmonary capillaries decreases. This decreases the surface area available for the diffusion of oxygen from alveoli to bloodstream and carbon dioxide from blood to alveoli. Lung elasticity also decreases, and respiratory muscles become weaker thus increasing the oxygen cost of breathing.

What results from these changes is a reduction in both **vital capacity** (total volume of air that can be exhaled following maximum inhalation) and amount of air that can be exhaled forcefully or quickly (**forced expiratory volume in** 1 second). **Total lung capacity** remains relatively unchanged, but with the increased rigidity of lung and chest wall tissues there is an increase in amount of air left in the lungs after a complete exhalation (called the **residual volume**). This increase in residual volume results in a decrease in maximum ventilatory capacity of the respiratory system, in terms of both respiratory frequency and total volume per minute, leading to less gaseous exchange.

All the above issues combine to result in a decrease in VO2 max with ageing which in turn results in a decline in aerobic performance.

Muscular declines

Muscle size and strength increase during adolescence (in women) and into the twenties (in men). This remains constant during the thirties and begins to decline in the forties. The rate of decline is slow at first: 10% between ages 30 and 50, increasing to 40% at 80 years of age. This loss of muscle tissue also produces a significant reduction in strength. This reduction in strength is also slow at first: beginning at around 10 to 15 % by age 50, after which decline is quite rapid (50 to 60% by age 70).

Decreases in strength and muscle size are primarily due to a reduction in size of individual muscle fibres and a reduction in the total number of fibres. Fast twitch fibres seem to atrophy (there is a reduction in the size of cells and tissues) to a greater extent than slow twitch (Lexell et al 1988). The number of fibres remains stable until about age 60, after which reduction is up to 25% (Lexell et al 1988) and up to 39% by age 80 (Sato et al 1984).

Skeletal declines

Bones lose some of their mineral content with age, particularly calcium, and become more porous and brittle, which can lead to a condition called **osteoporosis**. This loss of bone hardness means fractures are more likely. Osteoporosis occurs more often in women due to a decrease in oestrogen secretion after menopause. Swimming is not a significant defence against osteoporosis because it is a non weight bearing exercise.

Joints also become less stable, and flexibility reduces markedly with age. Collagen fibres are lost and synovial fluid in joints becomes less viscose leading to **osteoarthritis**, a progressive degeneration of joint surfaces causing swelling, stiffness and restricted range of motion in the joints. The American College of Sports Medicine recommends including flexibility and strengthening activities in a session to improve joint stability and range of motion.

Metabolic declines

Most untrained and normally active persons gain 0.2 to 0.8kg each year after age 30 (McArdle, Katch & Katch 1996). Accordingly, many men and woman double their body fat by age 60 (Brooks et al 2000):

- average man – 15% body fat increases to 28% by age 60
- average woman – 25% body fat increases to 39% by age 60

The main reason there is an increase in body fat is that there is a reduction in **basal metabolic rate** (number of calories used per minute at rest). The **BMR** depends on body size and composition, i.e., larger persons with more muscle tissue burn more calories at rest than smaller persons with less muscle tissue.

Effects of regular intense exercise on physiological declines

What we consider the normal responses to ageing can be slowed down if people maintain a regular pattern of vigorous training that is adequate in volume and intensity. This doesn't mean that adult swimmers must maintain training mileages of 80 to 100km a week. At any age, training mileages of 12 to 20 kilometres per week should be adequate to delay the effects of ageing. However, adult swimmers do need to maintain their training intensity at the same relative level as they age. The training intervals an adult swimmer can maintain and the times they are able to produce may get slower as they age, but they should continue to train with the same balance of endurance and sprint mileage, as well as the same percentage of maximum efforts (training zones).
With regular intense training the circulatory system can maintain maximum stroke volume and cardiac output, which in turn maintains oxygen consumption at a high level. This is because the cardiac fibres remain stronger, and the blood vessels stay more elastic. There is

training over other sports about maintaining respiratory function, because of the breathing restrictions imposed. This greatly reduces the loss of vital capacity, and respiratory muscle maintains a greater percentage of strength and endurance throughout life.

Regular bouts of endurance training also maintain higher levels of aerobic capacity with ageing. The rate of decline in VO2 max is significantly less for persons who continue regular training (Vaccaro et al 1984). While endurance training of any intensity maintains aerobic capacity better than no training, maintaining a high level of aerobic capacity requires that some of the training be conducted at high levels of effort and volume. Trappe and co-workers (1996) measured the VO2 max of distance runners between the ages of 43 and 50, having previously been tested between the ages of 18 and 25. They all had continued training at nearly the same levels of volume and intensity. Oxygen consumption values decreased by only 3.6% in that time.

Strength, power, and sprint training are best prescribed to maintain strength and muscle size as we age. This is because most of the decline comes from the fast twitch fibres. Research by Mitchell et al (1989) indicates that estimated normal muscle loss due to ageing can be reduced by at least 50% with long term resistance training, because it encourages maintenance and even development of fast twitch fibres.

Reductions in bone loss and decreases in mobility can also be slowed by regular physical exercise. Bones of Masters athletes have been found to have a higher mineral content and density than sedentary persons (Mcardle, Katch & Katch 1996).

Effects of physiological decline on components of fitness

Endurance

Aerobic capacity declines by 30 to 40% between the ages of 20 and 65 (Brooks et al 2000). This is due to:

- a decrease in stroke volume and reduction in maximum heart rate, which as indicated earlier, causes reduced cardiac output and thus a decrease in the amount of oxygen transported to the muscles
- a decrease in the number of mitochondria and aerobic enzymes, which reduces the amount of oxygen that can be removed from blood to muscles – in most untrained adults, concentration of aerobic enzymes decreases by 14 to 25% (Coggan et al1992).
- a reduction in muscle capillaries of 19 to 40% between ages 20 and 65 (Coggan et al 1992), reducing the surface area for diffusion of oxygen from blood to muscles

Studies by Hagerman, Costill & Wildrick (1996), and Pollock (1997) concluded that reducing the effects of ageing on endurance depended to a great extent on individuals' training adaptability. It also appears that highly intense training slows the rate of loss of aerobic capacity.

Strength, power, and speed

The ability to generate force and power decreases as we grow older, mainly because:

- there is a decline in muscle mass or size, and muscle fibres or number of fibres (There is simply less muscle tissue to apply force)
- fast twitch fibres display a more marked decline than slow twitch
- we produce less growth hormone which leads to reduced levels of protein synthesis and the muscle atrophies
- a decline in **creatine phosphate** (CP), the prime ingredient for short term muscle activity, which means that with less quick release energy in our muscles, the muscles are less capable of high intensity sprint type activities

Resistance training effectively slows decline in the size of fast twitch fibres, particularly after age 50. Unfortunately, it has no impact on loss of muscle fibres.

Exercise stimulates release of growth **hormone (**GH) which helps maintain lean muscle mass. Release of GH begins as soon as we start to exercise and increases with increasing intensity of the exercise. Intense speed and power training can combat normal decline in CP.

Flexibility

Flexibility or suppleness is the term used to describe the range of motion possible in joints. In adults, flexibility reduces with increasing age due to the increasing resistance of active restraints (muscle), voluntary and reflex control, passive restraints (connective tissue), and by the lack of activity associated with increasing age.

3.4 effects of age related physiological declines on the energy systems

Adenosine triphosphate or ATP is the sole source of potential chemical energy in the body. When the body is called upon to do work, ATP is decomposed into adenosine diphosphate (ADP), phosphoric acid and energy. The body recycles ADP back to ATP, allowing the further creation of energy to be used by the body.

Physical energy is created primarily by continual recycling of ATP. How ATP is recycled determines a swimmers' ability to work. There are three major ways that ATP is recycled within the body:

ATP–CP system

Muscles have a small amount of stored ATP and another high energy substance, creatine phosphate, in their cells for brief dynamic bursts of energy. The extra phos- phate from CP combines with ADP to reform ATP. The cycle continues until stores are depleted, usually 10 to 15 seconds. This system can be restored in two minutes.

Lactic acid system

The second anaerobic process the body uses to create energy uses **glycogen** (stored glucose). Glycogen is broken down in pathway called **glycolysis** to form pyruvic acid and ATP. In the absence of oxygen this pathway results in the formation of lactic acid. It is the formation of this lactic acid that limits this system.

Aerobic system

For periods of lower intensity effort lasting over three minutes, the aerobic system becomes the main energy system. Carbohydrates and fats are broken down to form pyruvic acid and ATP.

Contribution of energy systems, heart rate and effort during races

	25m 10–20sec	100m 1–2min	400m 4–8min	1500m 15–30min
% Anaerobic system	90	80	30–40	10
% Aerobic system	5	20	60–70	90
Heart rate (bpm)	180+	165–180	160–180	150–165

Through the course of a typical swim workout, Masters swimmers are likely to engage both aerobic and anaerobic systems. Age must be a consideration. For example, a 50 year old swimmer who has a maximum heart rate of 170 (i.e., 220 minus age), begins using anaerobic energy at a lower heart rate.

Effects of age related physiological declines on principles of training

Adaptation

Adaptation refers to metabolic and physiological changes that take place in response to training. The adaptive process occurs when the various organs and tissues operate at a level greater than usual. The adaptation process requires:

- proper training, to create a need for specific adaptation
- nutrients for growth and repair of tissues
- enough recovery for growth and repair

Overload

The basis of this principle is that adaptation occurs only when the demands of training are greater than the usual demands placed on that physiological system. The demands of training must be sufficient for adaptation and not too great or training effect will be lost.

Progression

A particular training load only remains an overload until the swimmer adapts to it. For further adaptation to occur, increase one of these variables:

- intensity of repeats
- volume (number) of repeats
- rest interval between repeats (training intensity)

Specificity

Physiological adaptations only occur in tissues, organs, and physiological systems (energy systems) that are stressed by training.

Individuality

Many factors cause swimmers to respond differently to the same training stimulus. Two important factors are:

The swimmers' state or level of conditioning when training begins
Swimmers improve rapidly if they have taken a long layoff and are out of condition (this occurs mostly in the first 6 to 12 weeks). All components of fitness improve, for example speed, endurance, and strength, regardless of the type of training.

Hereditary factors
Heredity largely determines the maximum training response for various physiological mechanisms, both aerobic and anaerobic, e.g. each different type of muscle fibre affects how an individual responds to certain types of training.

Reversibility

Just as proper training methods result in adaptations that improve performance, lack of training leads to a reversal of these adaptations and causes performance to decline. The rate of loss is slower if the intensity and frequency are merely decreased and if the reductions are not too great.

Benefits of stretching for adults

Flexibility refers to the range of motion available in a joint (e.g., hip joint) or series of joints (e.g. spine). Achieving a certain degree of flexibility is critical for anyone involved in sport; otherwise there will be breakdown in body tissues leading to injury.

Stretching also forms an integral part of rehabilitation programs. Following an injury there is a lot of scar tissue, which tends to be functionally shorter and have more resistance to stretch than injured muscle. If you are too tight in certain body parts you are functioning below real potential. Flexibility, because it improves range of motion in a joint, can improve motor performance and skill execution.

Static flexibility
Static flexibility describes the range of motion about a joint or joints without a movement phase to it. This is the maximum range of movement a joint can achieve with an external force such as gravity or manual assistance. An example is a hamstring stretch held at the very end limit of movement.

Dynamic flexibility
Dynamic flexibility describes the range of motion about a joint or joints, with a movement variable used to take it to that maximum range. For example, a sprint freestyle swimmer needs rotational shoulder flexibility produced at high velocities.

Proprioceptive neuromuscular facilitation (PNF)
PNF is a type of stretching based on the concept that muscle relaxation is fundamental to elongation of muscle tissue. It uses the proprioceptive abilities of the golgi tendon organ and muscle spindle to relax or inhibit the muscle and gain a more effective stretch.