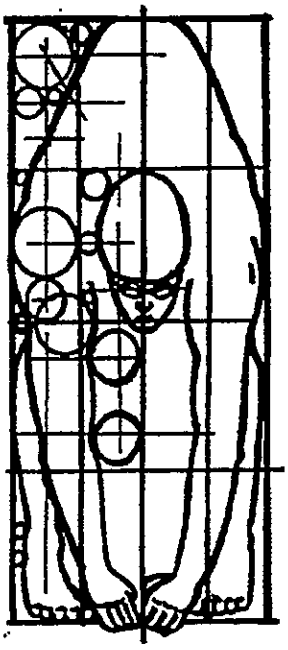

AUSTRALIAN MASTERS SWIMMING COACHES NEWSLETTER

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Editorial

Hello to all you Readers

As Anita mentioned in her last newsletter Peter and I have taken oven the publishing and editing of this publication.

Anita did a fantastic job producing this publication for nine years. On behalf of all the Masters Coaches and Swimmers Anita, we'd like to say "thankyou for the tremendous contribution you have made (thus far) to Masters swimming." We wish you and your family all the best in Sri Lanka. I am sure it won't take long before the name Anita Killmier is as well known in that land as it is here is Oz.

Unfortunately I do not have Anita's energy or time, so you will find the publication is no longer 28 pages but rather 12.

This issue continues to reprint articles from various sources, however, we would like to produce more original copy. This is where we depend on you the Coaches to send in any information or articles that you would like to share with other coaches.

We would also appreciate any suggestions you may have to improve the publication. This is your publication, let us know what you want.

At present we are aiming to include a Coaches Corner (articles from any Coaches); News from around the Branches (State Coaching Directors reports);Technical Tips; Dates to Remember; AUSSI Resource Centre; article from a State Coaching Director; Scientific Section (reprint articles from THE MASTERS ATHLETE or other recognised Masters publication) and any other general information. We'd also like to have a Coaches Profile.

As you can see the publication is reliant on contributions from you. If you have anything to share please send it to the editorial address to the left of this article.

A special thanks to Graham Needham, Peter Nowlem, Rod Porteous and Maggie Barrett for contributing to our first, new format issue.

Congratulation to Rod Porteous for being voted AUSSI Masters Coach of the Year. Your hard work and enthusiam Rod are appreciated by all who benefit from your dedication. Well done and thank you for all your time.

A big thank you should also go to all the State Coaching Directors and other Masters Coaches who devote so much of their time to the sport for very little reward.

From Around the Branches

(Reports from State Coaching Directors)

Tasmania

With the formation of two new AUSSI clubs in recent months, the Branch now has a total of nine clubs. The latest two are in the Hobart metropolitan area, and have been formed at a major Health and Fitness centre, the other at the new Tattersall's Aquatic Centre.

Each Club is in the fortunate position of having at least one qualified coach - albeit not all with the Masters component qualification, looking after the interests of its members. All coaches have at least Level 1 training, through to Level 3, and there is a core of nine coaches throughout the state with Level 1 Masters qualification.

Of these, eight have undertaken the first steps towards upgrading to Level 2M. The swimming specific component of this course was conducted over two full weekends in August and October. Coach in Residence was Mr. Buddy Portier of the Victorian Institute of Sport, supported by a range of local experts in the other speciality areas which are covered in this course, as well as Mr. Chris Wedd, Level 3 Tasmanian coach.. The course reflected a priority in our strategic plan, and was budgeted and largely paid for from Branch funds. Effectively, each participant received a subsidy of $250 from the Branch. This course was a considerable undertaking for a small state with a relatively small membership.

The eight candidates working towards this upgrading have actually taken on board an enormous work load - it will take them close to two years to complete the requirements for accreditation - all on a voluntary basis.

Coaching plans for 1998 include conducting a Level 1M course, in conjunction with Tasmanian Swimming Inc., with the specific aim of giving currently qualified coaches the opportunity to undertake the supplementary hours of theory work to cover the Masters component. Our eight Level 2M candidates still require much support in their efforts towards accreditation, however, the Branch now has a group of experienced and respected coaches who can be called upon to conduct lectures for further candidates.

Megan Stronach

Victoria

Melbourne is hosting the ASCTA Conference in the first week of May and we are looking forward to having the best of the best here to share their knowledge with us. The Masters stream will consist of two lectures and a forum though the topics are still to be confirmed. We are pleased to have Judy Bonning from the US delivering one of the lectures as we believe she will be a drawcard to the stream; the other lecturer will be Victorian. Kay Cox (National Director of Coaching) has been liaising with us to ensure the stream is presented in the most professional manner possible.

We are hoping to run a Level 1M course in either June/July or October depending on what facilities are available. Unfortunately there was not enough interest to run the full course last year but feel there will be in 1998. There is no prospect of a Level 2M course at this stage.

Finally, we do have a prospective Director of Coaching in the wings and hopefully he will be officially appointed in the next few weeks.

Jodi-Ann Beard

Continued on page 2

From Around the Branches
continued from page 1

South Australia

Program for 1998

Four stroke correction workshops are planned (2hrs per workshop) on the 3.5; 7.6; 13.9 and 4.10.98. Cost $10.00 each by amateur and or AUSSI coaches.

October - December 1998: Level 1M &Level 2M Coaching course pending number of participants.

The 1997 Coaching Course was successful (conducted by Janet Malone). 1997 Stroke Correction Workshops were all fully booked out (4). One programming seminar was a flop in regard of participation.

Dieter Loeliger

Western Australia

In W.A. the role of coaching and education is divided up between two portfolios, the Director of Fitness and education has the overall responsibility for the education of coaches and members whether it be fitness, swimming techniques, coaching or general health. The State Coach liaises with clubs on coaching issues. These two people work together to give members a comprehensive service that would not be possible for one person in a voluntary capacity. In the past year State Coach Gordon Medcalf made a record 17 visits to clubs.

W.A. conducted another Level 1M Coaching Course in 1997 with 22 coaches attending. These courses are conducted in Perth and for the first time we had 4 country coaches participate. The Austswim Adult Extension course for teaching adults to swim was also conducted by AUSSI W.A. This course attracted 16 teachers and was well received with future course in demand. Besides training teachers this course also helped to promote AUSSI to a broader aquatic community and provided a potential source of members and coaches.

W.A. has a 'State Coach of the Year Award" that recognizes coaches who have exceptional service to coaching. This year the honour was awarded to Peter Maloney of the Melville club. Peter put in an exceptional year of coaching with this club as well as Education in video taping practical stroke clinics for use by county clubs.

Seminars and workshops for members are provided during the year. The two topics that were requested by members were Nutrition Facts and Fantasy and goal-setting for AUSSI swimmers. These proved to be very informative and developed some skills for members.

Kay Cox

Director of Fitness and Education

New South Wales

I believe that, as a body, Masters Swimming Australia could not exist without coaches. As a body, we need to work towards the aim that we have the services of at least one coach with masters training and experience and preferable Level 1M qualification, in every club in each State.

The list I received this week from the Australian Coaching Council, dated 2/12/907 records 46 Level 1M coaches at that time, but has 3 coaches on the list who do not belong to Masters Swimming in NSW and live in Albury, Bogangar and Coffs Harbour so are probably registered members of Victoria or Queensland. Since that time we have had 8 more coaches reregister, complete all components of the course or be granted their accreditation. Two of our coaches are moving interstate, so our current number on file is 49.

I personally, am very proud of the efforts that NSW clubs and coaches have put into raising the level of expertise in the State so that we now have qualified coaches in 18 of our 40 clubs. Our aim is to spread our numbers into all clubs. Our other aim is to upgrade these coaches to Level 2 and we wish to run a Level 2M course in 1999. We would welcome any offers of assistance from other states who have already run this level course regarding provision of lecturers, resource material etc.

In NSW we are conducting our 6th Level 1M course, over two weekends on 18 & 19th July at the University of Sydney Pool and in Nowra on 1st & 2nd of August. All are welcome. If others states are offering courses of Level 1M, or especially Level 2M, please notify us ASAP for interested members. Hopefully, AMSCN will be able to advertise courses, develop an interaction between States, (great idea - Ed.) facilitate the change of addresses and maintain contact with those coaches who leave one State for another. All too often, I feel, that we lose the involvement of valuable, qualified members of AUSSI through lack of continuity between States.

Di Coxon-Ellis

N.T.

AUSSI NT Branch swimmers were hard at work, over the first three months in particular, training for the National Swim in Hobart. 16 swimmers committed themselves to making the long haul to Hobart, not only to have a good time and aim for PB's, but also to promote the 1999 National Swim which will be held in Darwin in May next year. Swimmers braved cyclone warnings, electric storms and extreme water temperatures, all with the aim of improving their fitness, meeting with friends and fellow squad members for fun and some serious training offered through AUSSI.

Favourite Set

Here is one of my favourite Heart Rate sets (I would like to thank my coach, Mark Davies, for this one), which I have found quite helpful in monitoring swimmers' heart rates as well as giving them feedback on times and how their pacing and effort is progressing over the 100m distance. The set usually occurs after a warm-up and some drill work, totalling at least 1500m.

Continued on page 5

National Coach of the Year

This award is presented for exceptional service to coaching AUSSI Masters Swimming throughout Australia. This Award was instigated in 1990 and since then has been awarded to coaches who have contributed in a variety of ways in different levels. Sometimes the contribution has been as club coach and for others the work may have been at Branch and/or National level. Submissions are from Branches and these are assess by the national Coaching panel, the Panel this year consisted of Kay Cox, Peter Reaburn, Peter Jackson and Ted Tullberg.

This year the 'Coach of the Year' as won by Rod Porteous of Gladstone Groppers (Qld). Rod is the Director of Coaching for Queensland (North) and has contributed at Club, Branch and National level. He has several coaching qualification, Level1M Swimming, Level 1 Strength and Conditioning, Level 2 Lifesaving and is working on his Level 2 M Swimming. At club level Rod has contributed a substantial amount of time coaching as Principal Coach and with his own group. He has been very active in updating his qualifications and has participated in many workshops and seminars as a coach and a lecturer. Rod presents a very positive image of a coach and is very supportive of all his members goals. He also promotes a very positive image of AUSSI Masters Swimming with his professional approach to his coaching and preparation of swimmers. His training programmes have been successful which has been demonstrated by improvements by his swimmers in competition and in other areas such as the aerobic award programme. Road has introduced several innovative ideas in his coaching such as counting stroke rates and has been instrumental in producing the Queensland Coaching Newsletter. Rod has also contributed his time and expertise in the National Coaching Workshop and the rewrite of the Level 1M coaching course.

In summary Road has had an exceptional year and fully deserves his Award as 'AUSSI Masters Swimming Coach of the Year'. Congratulations Rod.

Off Season Swim Training

by Rod Porteous
(Director of Coaching (North) for Qld Masters Swimming)

The aim of this article is to outline activities which will maintain the aspects of fitness in the 'off season' while, at the same time, focusing on specific points for continual improvement.

It is hoped swimmers are working to a season plan based on blocks of time sometimes called cycles:

1. maintenance
2. build up
3. specific preparation
4. peak performance
5. deconditioning

The first of these cycles should cover the deconditioning and maintenance phase of the plan. The build up to peak performance places heavy stress on body systems. The deconditioning phase allows the body to recuperate in readiness for the next build up and preparation.

The purpose of the maintenance phase (the off season) is to retain a degree of the fitness gains from last season and aid preparation for the coming season. The maintenance period should therefore contain elements of fitness aimed at improving next season's peak, specifically dealing with any weakness.

Fitness can be simplified to the 5S's - **STRENGTH, SPEED, SUPPLENESS, SKILL, STAMINA.**

There is interaction between the 5S's of fitness. Strength is needed to develop speed and improves stamina. It has been my experience that the majority of masters swimmers, especially the older and female, lack strength or have diminishing strength levels.

Suppleness or flexibility is required to improve skill. Strength, suppleness, and skill improve speed and stamina. The lack of suppleness can be seen across all ages of swimming again more so in the older swimmers.

How can these declines in stamina, flexibility and strength be addressed during the off season?

Strength

Resistance training (weights) is the best method to improve strength. Ensure that the Coach/Instructor is qualified in this area (eg. Australian Strength and Conditioning Association) before commencing resistance training.

Perhaps the simplest and easiest resistance equipment to master is stretch cords. These are available from several suppliers in various resistance levels and are not cost prohibitive. They can improve strength, speed and stamina. Be careful to duplicate stroke patterns as it is easy to pick up faults.

Base your stretch cord workout on the time requirement of your goal event. Stroke at a rate equal to or above your pool stroke rate and don't cut the stroke length when tired.

Stamina

Should you be fortunate enough to have pool access year round, continue swimming at a level that will maintain base fitness, ie 70% to 80% of maximum heart rate. To make next year's training a little easier, do at least one hard session per fortnight.

The unlucky ones without pool access need an activity that will elevate their heart rate to the 70-80% zone for at least 20 to 40 minutes.

Cross training on any form of ergometer with a heart rate monitor and stop watch is also recommended.

My favourite is the combination cycle (arm/leg), though swimmers who do not coordinate alternating arm/leg well may look at the new double arm/leg machines (freestyle and backstroke are alternating arm action, breaststroke, butterfly are double arm action).

Instead of just sitting aimlessly pedalling be a little creative. Equate your pool training distance to time and enjoy the workout.

Running is arguably one of the best exercises for basic conditioning although some of us do not possess the physiology to be runners - walking at a brisk pace is the next best thing. To add sports specificity to the workout, finish the session with stretch cords.

> A SEASONAL PLAN SHOULD BE BASED ON THE FOLLOWING CYCLES: MAINTENANCE, BUILDUP, SPECIFIC PREPARTATION, PEAK PERFORMANCE AND DECONDITIONING.

Suppleness and Skill

As a coach, I have tried to improve the technique of my club swimmers with varying degrees of success. Those with good flexibility improve and those with poor flexibility do not.

When was the last time you looked at your posture - more importantly the position of the shoulders and hands in relationship to the trunk?

Modern day practice of sitting for long periods slowly develops incorrect posture. The classic stance is rounded shoulders, head forward, the points of the shoulders in front of the chest with the palms facing the front of the legs. Sound familiar?

This posture limits stroke mechanics. A classic sign in the pool for freestyle and butterfly is the palms facing the water as the hands lead the recovery phase.

Breaststrokers looked hunched over side on, with rounded shoulders front on.

Backstrokers tend to lead the recovery with the elbow and bent arms. The hands are moving apart over head before entering the water. In extreme cases the entry will be almost square to the trunk.

Correction of posture during the off season may be the biggest single contributor to swim improvement.

What needs to be done is to get the shoulders in correct alignment with improvement to the thoracic spine (upper back) curve.

This is achieved by dropping and pulling in the shoulder blade, straightening the upper back, and stabilisating the hips.

Dropping and Pulling in the Shoulder Blades

Shortening of the subscapularis muscle causes the shoulder roundness combined with shortening of the pectoral muscles which brings the shoulders forward.To reverse the rounded shoulders stretch the pectoral muscles at the front of the chest. Strengthen the rhomboids, lower trapezius, general erector spinae, and spinal stabilising muscles - the muscles that pull the shoulder blades towards the spine.

Reverse fly's in the gym with light or heavy weights will help strengthen these muscles as will lying face down on the floor, arms out by the side, palms down and doing little lifts of the hands off the floor.

Thoracic Spine (upper back) Curve

To improve the thoracic spine curve, roll a towel to a comfortable diameter, lay face up on the floor with the towel across your back, place your hands overhead, arms straight, back of the hands on the floor. This will feel like giant hands are pulling the rib cage apart.

Start with the towel at the lower middle of your back holding for 30 seconds then move the towel up a couple of inches and repeating the stretch. Repeat these steps until reaching a point between the shoulder blades then reverse this sequence to the starting point.

Pelvic (hip) Stabilisation

The object of pelvic stabilisation is to tighten the abdominal muscles.

The exercise required to do this is to lie flat on the floor and feel like the lower back is pressing against the floor.

When stabilisation has been mastered you should be able to lift your legs off the floor, without losing the pressing feeling of the lower back against the floor.

When stabilisation has been mastered you should be able to lift your llegs off the floor, without loosing the pressing feeling of the lumbar spine against the floor. Once again independent to breathing. A pressure bio-feedback pad is available to accurately monitor progress (try your physio for this peice of equipment).

To improve your suppleness and ultimately skill in the water next season requires weekly sessions of 3 x 30minutes minimum with 4 x 45 minutes optimal.

Coaches Corner

Backstroke :- A Different View

By Gary Knight

Out of the four competitive strokes, we should be giving our swimmers between 20 and 50% Backstroke in an attempt to balance the muscle groups on the front and back. Thus avoiding the typical round shouldered appearance of many swimmers and it's associated shoulder injuries. I also believe by doing more backstroke in our workouts, helps improve the feel for the water in our other strokes. This is evident in that many of the world's top swimmers have come from a background in backstroke. Said this, it often amazes me that many people dislike or even loath Backstroke, when it can be one of the more relaxing of all the swimming strokes. This dislike of the stroke is probably more so within the Masters movement.

So why do so many people find backstroke so difficult that it becomes a chore to do? I believe that there are two reasons that swimmers dislike backstroke. Firstly, poor technique makes a relaxing stoke into a very labor intensive and uncomfortable stroke. And secondly, not being able to see where you are going, has many swimmers and coaches alike on edge when ever backstroke is included in the program. If lane space is limited, coaches often limit the amount of time given to backstroke, in favor of one of the other three competitive strokes.

In this article I will deal with the issue of technique rather than that of how to get our swimmers to do it on their backs more often.

To achieve good backstroke, our swimmers must have good body position, be able to rotate well, have a long stroke, and a great kick. Nothing new here, it's the same for all the strokes. What I intend to do is look at each of these four points and give you an insight into how I work on each.

Body Position

Often we see swimmers, that are having difficulty doing the backstroke, swimming in a seated position. This is one of the easiest things to over come and can usually be fixed in one or two pool sessions by getting swimmers to kick laps in a streamline position with the hands clasped above the heads. Too often I see swimmers doing backstroke kick with the hands by the side or by holding a kick board to the chest or under the head. All these teach the swimmer to swim in a seated position and should be avoided. Some swimmers will have difficulty with holding the hands clasped above their heads due to inflexibility in the shoulders, however, if the back is arched up and the arms are held above the head in a straight line, then an acceptable body position can still be achieved. Some swimmers with poor kicks may need to do this exercise with fins. If fins are used we should try to use the short blade types that are around, as these give the added buoyancy needed, yet do not hinder the fast kick required in backstroke. Out of the pool, the swimmer should work on shoulder flexibility and core body strength as these will aid good body position, in not only backstroke, but also the other strokes. By working on these two areas, the swimmer improves the stability of the trunk, thus forming a solid base for the other muscles to work on. A stable trunk is like paddling a surfboard compared to a bean bag.

> "A STABLE TRUNK IS LIKE PADDLING A SURFBOARD COMPARED TO A BEAN BAG."

Body Rotation

Many novice swimmers attempt to do the backstroke with out any rotation of the body. Young swimmers can almost get away with it due to their high degree of flexibility in the shoulders. However, the older the swimmer gets, the less flexible the shoulders and the need to rotate becomes more apparent. A swimmer with limited flexibility in the shoulders can still achieve an acceptable hand entry position, by rotating the body. So how do we teach our swimmers to rotate? I achieve this by including body rotation in all drill work and most kick. By doing more work on our sides, we are helping our swimmers to get comfortable being uncomfortable. Many swimmers find being on their sides uncomfortable due to the loss of buoyancy. While doing any body rotation work it is important that the head remains stationary and not allowed to follow the shoulder rotating into the water and that the whole body is rotated and not just the upper half. Again core body strength and flexibility play an important role in being able to rotate the body, while maintaining head stability and good body position. A drill I find particularly good for rotation work is one that I call " Backstroke 6 kick change Drill ". To do this drill, the swimmer kicks on their side with one arm outstretched above the head and the other by the side. The chin is brought to the upper most shoulder. After six kicks a single stroke of backstroke rotates the swimmer to the opposite side. It is important that the outstretched hand is held so the palm faces the bottom of the pool. This helps hand entry. Again, swimmers with poor kicks should be encouraged to use short blade fins for this drill, which will aid in maintaining body position. This drill is great for improving the kick also.

Stroke Length

I won't bore you with the details of the stroke pattern in backstroke as this can be gained from any swimming text book. What I want to put to you is a different look at how this pattern is achieved. What I am getting at is that I never talk about the "S" pattern in backstroke, sure the hand does trace an "S" pattern as it seeks out new water while pushing the body passed it. The thing is, if we teach our swimmers to trace out an "S" pattern while doing backstroke, that's exactly what they will do. The body will stay relatively still, compared to the hand tracing out the "S" pattern, resulting in a much shorter stroke length. The thing to come to terms with is, in an ideal situation, the swimmer is trying to push the body through the water without the hand traveling backwards. Thus, the hand should leave the water at around the same position as it entered and in elite swimmers the

Backstroke continued from page 4

hand may even leave forward of the entry point due to the kick. If good body rotation, hand entry, and a bent arm pull are achieved then the so called "S" pattern of the pull will also happen without shortening the stroke. We have already talked about body rotation and the other two have been described as a karate chop followed by an arm wrestle. So simple, yet the result is exactly what the text books are trying to tell us. An invaluable aid in achieving a good stroke length, with the points I have made above, is by using " SKATE 3000 "hand paddles. I have found that the junior version of these are excellent for enhancing the stroke pattern and thus stroke length. By combining these things and stroke counting drills will see a dramatic improvement in the length of each stroke.

Kick

A strong, fast kick is essential to a good backstroke. A backstroker's legs should be both aerobically and anaerobically fit to maintain the six beat kick required. The kick should be kept small and only the tempo increased to match the speed. Far too many swimmers use a large two beat kick when doing easy backstroke. This type of kick is strong yet does not produce speed. I liken the large two beat kick to the prop on a tug boat compared to that of a torpedo. To make a torpedo go faster, they don't increase the prop size they increase the speed of rotation. So, how do we get those legs fit enough to do fast backstroke? Firstly we must gain endurance in the kick by doing lots of interval kick sets at just under anaerobic threshold. These should be of short rest duration and of distances to suite the swimmers kicking ability. They do not have to be all backstroke, and could be just as well done on the front. To gain speed, I like to do sets that involve 2 x 25m max effort kick with a board on 60s followed by 100 easy freestyle. We usually do this set 4 times through. The two 25's could just as well be replaced by a single 50m effort. I have had great success with this type of set in producing excellent kickers in my junior squad and do not see that the same results could not be mirrored with Master's Swimmers. Some backstroke kick sets could also be done with short blade fins making sure the knees don't pop out of the water, again speed is the important thing. I see many master swimmers doing lots of kick with fins at an easy pace, all this seems to do is change the kick pattern so much so that the kick is no longer effective when they are removed. Another way to achieve excellent anaerobic ability in the legs, is by doing solid sets on the exorcise bike. My favorite set is to do 5 min easy spinning, followed by 1 min max effort, 1min easy spinning, 5 times through, with a 5min easy warm down at the end. To do this set effectively you need a bike that will allow you to go fast. Many of the bikes with fins on the wheels, to produce resistance, tend not to allow enough speed during efforts. They are great for power but not for speed.

Once the technical aspects of backstroke are achieved you will find that your swimmers will gladly participate in backstroke sessions. I conclude many of my programs with a swim down that is predominately Backstroke. The benefits of being able to have swimmers do the backstroke are improved muscle balance, and better feel for the water. An added bonus is not many people do backstroke, particularly the longer events, and therefore your swimmers stand the chance of winning more races.

Technical Tips

Sport Coaches should know and be able to describe the rules pertaining to their sport. Too often, I hear coaches of Masters Swimming give misleading and/or wrong interpretations of the AUSSI Swimming Rules. Coaches must know the Rules *as written* not as heard from someone else then further embellished.

For Example

I heard a coach explain to his swimmer that you are allowed two arm strokes when you roll over for a backstroke tumble turn. With some imagination, this could be seen to be true but it should have been explained what those two arm strokes are allowed to do. You can have one stroke to initiate the roll over and another to initiate the turn but: "Once the body has left the position on the back there will be no kick or arm pull that is independent of the continuous turning action".

Immediately before this, the rule states: ".... a continuous arm pull may be used to initiate the turn." Which is the part being misinterpreted.

AUSSI Swimmers are often disqualified for an arm pull (on their front) pulling themselves forward *prior to* the turn. This is clearly an infringement.

So don't say:

"You're allowed two arm strokes in the backstroke turn" explain the rule accurately.

Ivan Wingate Referee

From Around the Branches continued from page 2

Swimmers are first taught how to obtain their maximum heart rate using the standard formula of HR max = 220 beats/min - age in years. A test run is also made to ensure that all swimmers are easily able to obtain their HR after completing an effort, along with an easy method of counting and converting the count to heartbeats per minute. (The number of 100m in each set is usually less to start with and builds up according to the swimmers' levels of fitness.)

Heart Rate Set:

6 x 100m Fs @ 2.00 min (HR 30BBM*)
200m easy (active recovery)
4 x 100m Fs @ 2.15 min (HR 20 BBM)
200m easy (active recovery)
3 x 100m Fs @ 2.30 min (HR 10 BBM)
200m easy

The set is used regularly with HR and times for each 100m recorded by swimmers at the completion of each 100m. After doing this set a couple of times, the swimmers come to realize that if they aim for a particular time, (eg 1.30min) then they will also achieve their target HR of 30 BBM (eg HR= 160 for a 30 yr old). Even those swimmers who have difficulty with obtaining HR can see a pattern emerging as the set progresses.

Used over a period of time this set has a number of benefits for swimmers:

- swimmers can see improvement in their times for the same HR;
- swimmers learn how to pace themselves against the clock to achieve both the target HR (eg 30 BBM) and their desired time;
- swimmers are familiar with the amount of effort needed to achieve and maintain a time over 100m;
- swimmers learn the importance of HR and how its controlled use can help them pace their sustained efforts to complete a full set;
- swimmers become proficient in the use of HR to monitor their efforts in training;
- the set becomes more individualised and holds personal relevance on each swimmers's progress.

*BBM - Beats Below Max (ie heart beats below maximum heart rate)

Jacinta Stirrat

Scientific Section

The Importance of the Base

by Dr Peter Reaburn

Triathlon, cycling, rowing, running, and swimming have one thing in common cardiovascular endurance. Sports science breaks endurance into two components, the central component (the heart and blood) and secondly, the peripheral component (muscle level). With the right type of training, changes occur in both these areas - changes that enhance endurance both in terms of how far we can race, and how hard we can race.

Within the **central component**, the correct training causes the ventricles (the pumping part of the heart) to get bigger and stronger. This means more blood and therefore oxygen to the working muscles. Again, with the right type of training, the blood volume gets larger in two ways. Firstly the fluid part of the blood (the plasma) increases. Secondly, an increase in the number of red blood cells. However, the fluid (plasma) increase as a percentage of total blood volume is greater than the increase in the number of red blood cells. This means that, with the right type of training, the blood becomes less viscous. That is, the blood flows more easily around the blood vessels, therefore allowing more oxygen to get to the working muscles and putting less strain on the heart. All these changes mean improved endurance - with the right training!

Perhaps the more important training changes occur in the muscle at the **peripheral level**. These changes include more capillaries around each muscle fibre - therefore increasing oxygen delivery and removal of carbon dioxide and lactic acid; increased concentration of chemicals that use oxygen to create aerobic endurance energy; and very importantly, increased ability to burn fat as a fuel. Why is fat as a fuel so important? For two reasons - in long term endurance we only have enough glycogen (stored carbohydrate) in our muscles and liver to last 60 - 90 minutes of solid racing. Secondly, using more fat as a fuel does not allow us to produce lactic acid, a substance that slows energy production and upsets muscle contraction. Lactic acid can only be produced from glycogen and glucose, not fat.

Therefore, with the right type of training, we can see that all the above changes can lead to improved endurance time and race speeds. The obvious question is what type of training is right? The answer - base training, long slow distance, "the miles (showing my age!) in the legs".

Scientific studies on cyclist, runners, and swimmers, have conclusively proven that base training of low intensity and long duration, produces all the changes outlined above. Very importantly, it also keeps us away from sports physicians and sports physiotherapists. Both these groups of health professionals would also recommend base training - on the basis that it strengthens and develops muscles, tendons, and ligaments prior to commencing the harder work later in the season.

> "WITH THE RIGHT TYPE OF TRAINING, CHANGES OCCUR ..... THAT ENHANCE ENDURANCE BOTH IN TERMS OF HOW FAR WE CAN RACE, AND HOW HARD WE CAN RACE."

We've now seen why the long, slower base work early in the season is important - for physiological and injury prevention reasons. To develop this base, there are definite guidelines to follow. These guidelines are expressed in terms of F (frequency) I (intensity) T (time).

Frequency: Sports science would suggest we need a minimum of three times a week on any one sport to develop our base. We can maintain on twice a week, but to develop the base we must train at least three times per week. In cross trainers such as triathletes we could argue that twice a week on running and cycling might be enough stimulus to bring on these changes. If time is a problem for a triathlete I would agree. If not, try and work three times a week on each discipline particularly on your weakest leg of the triathlon. As you get fitter, the number of times a week can increase, but make sure you work on the principle of **progression**. That is, gradually increasing the number of times per week.

Intensity: Sports science recommends a minimum of 60% of maximum heart rate to improve aerobic endurance. This 60% figure is suitable for the person coming off doing no training for years. For masters athletes I'd suggest 65-75% of maximum heart rate. Maximum heart rate is theoretically calculated by taking your age from 220 (eg. a 20 year old would be 220 - 20 = 200). My experience tells me this figure is very "agricultural". Recent research done in the United States suggests different formulae: for men: 214 - (0.8 x Age); for women: 209 - (0.7 x Age). Heavier men and smokers tended to have lower maximum heart rates. Maximum heart rate may also differ for bike and run, due to the different body position and muscle masses used. Recent scientific evidence suggest the following ways of calculating maximum heart rate - running maximum heart rate = 209 - (0.587 x Age); cycling maximum heart rate = 205 - (0.687 x Age).

While these formulae above might suit many people, the best way to find your own maximum heart rate is to either undertake a maximal aerobic capacity test at a laboratory or do 2-3 repeats of 2-3 minute maximal efforts with short (1-2 minutes) recoveries. This is hard work and not recommended for athletes over 40 or those "at risk". Wear a heart rate monitor and note your heart rate at the end of the second or third repeat. Don't rely on the finger on the neck technique - you'll miss a beat or two over 10 seconds and therefore 6-12 beats over a minute.

Again, as the endurance fitness increases, progressively increase intensity. However, there will come a time when too much intensity will cause overtraining problems. Listen to you body and if it tells you to rest, lighten the load or take a day or two off. In future issues we will discuss the concept

Continued on page 9

Is There an Order to Stretching ????

by Michael Dalgleish

Committed older athletes consistently spend time in stretching both before and after activity for improving performance, minimising recovery time and effective injury prevention. Research now suggests that there may be an optimal order and content to your stretching routine.

Flexibility and Aging

In 1991, two researchers who work predominantly with masters athletes examined the range of hip and knee motion of 1,892 individuals between the age of 25 and 75 years. Their conclusion was that any loss of joint mobility should be viewed as abnormal and not attributable to aging. Therefore, as with the younger individuals, a stretching programme should be initiated as treatment.

Later work by Misner and co-workers (1992) examined shoulder and hip range of motion in women in the 50 to 71 year age group. They showed that older people can improve and/or maintain range of motion through participation in a regular stretching and exercise programme done three times per week over 5 years. No longer is there validity in the excuse that "I'm not as flexible as I used to be". We have all used it but the simple answer is that we need to spend more time in quality preparation for our activity.

Stretching methods

Fortunately, many of us seek out good reference textbooks and popular readings to provide us with the necessary programme content for our sport specific stretches. A number of points concerning stretching are now established:

1. There are three methods of stretching : (a) ballistic or bouncing type stretching, (b) static or holding stretching and (c) the more recently popularised PNF or Proprioceptive Neuromuscular Facilitation.

2. Stretching is still the best method for increasing flexibility/range of motion when compared with passive heating (hot packs/infra-red lamps), massage and exercise (cycling and running).

3. Stretching is specific to each joint or muscle/muscle group and, in a single session, improvement in range of motion is proportional to performing an optimal number of repetitions of each individual stretch.

4. An individual sport-specific programme requires an understanding of the biomechanics and muscle/joint function of each sport.

5. The stretching programme should be included as part of a pre-sport warm-up and completed at least 15-20 minutes prior to exercise and before skill specific warm-up.

6. Slow static stretching without bouncing (ballistic) should be maintained at the end of the range. Do not stretch into pain !!

7. Hold each muscle or joint stretch for at least 15-20 seconds.

8. Three to five repeats of each stretch appears to gain optimal increases in the range of motion within the time constraints of a normal warm-up.

9. Improved flexibility is only achieved through a long term stretching programme.

10. Ensure that structures on both sides of a joint are regularly stretched (e.g. hamstrings and quadriceps) therefore avoiding flexibility imbalances of muscle groups and joints.

Recent evidence suggests that not enough attention is paid to the content, technique and sequencing of stretches. In the more explosive, short duration sports (such as sprinting) slow sustained stretching has a limited place in the pre-competitive warm-up or prior to training sessions such as starts or maximal velocity work. Instead, limited static stretching is combined with more ballistic or explosive active stretching. This component is gradually increased in intensity to maximise the nerve response in the body and thus decrease reaction time and the time to peak muscle tension required to move the body or an object quickly.

Static stretching is still utilised in a periodised programme during recovery sessions and prior to lower intensity workouts. The higher the explosive component to your sport the greater the need for optimal muscular balance and symmetrical joint range of motion. The content of each individual sports stretching programme needs review with your sports physiotherapist to ensure its sport specific relevance based on new research findings and that it suits your changing physical profile.

Stretching technique

It has become increasingly of concern that the technique employed by many athletes in assuming a particular stretch is not maximising the possible gains for the time spent. This is partly a problem with the initial instruction given during our education and partly as a result of the lack of anatomical knowledge of what it is we are trying to stretch. For example, in stretching the two joint calf muscle everyone knows to use a straight knee. However, very few athletes realise that maintaining the knee cap over the line of the third toe increases the effectiveness of the stretch. Any deviation from this technique increases the roll of the foot and ankle joints (increases subtalar joint pronation) in gaining the perceived range of motion. Every stretch you have ever attempted involves a complex interaction of joint, muscle and nerve structures and therefore requires perfect execution to maximise the range gain in proportion to the valuable time spent!!

Finally, most athletes realise that many of our stretches involve movements of muscles and joints. However, few appreciate that the nervous system and its attachments are compromised in many of our stretches. Commonly, hamstring stretching in athlete programmes employs an extended knee position. This unfortunately stretches the sciatic nerve in preference to the hamstring in many individuals. Remember, the golden rule is that if it is a muscle stretch then the stretch should be felt in the belly of the muscle, and not behind the knee as with a straight leg 'hamstring' stretch.

Sequencing

The correct content of a stretching programme will involve muscle stretches then joint stretches and, finally, nerve stretches.

1) *Muscle stretches* should ideally begin with large muscles and then

Continued on page 9

Who Do You Think You Are?

Verse 1.

The race is on to Swim at the State Championships
The Referee has blown the Whistle,
Prepare to Dive off the Blocks
The Stakes are HighPB's and Qualifying Times are on Demand.
What's driving you is motivation and the desire to achieve your Goals
And the Coach would say from the Pool Deck
WHO DO YOU THINK YOU ARE?
Do you think you are
Some kind of Superstar -that
doesn't need to train?
You have to Train hard, Swim Hard, Think Hard and Win Hard
To swim at the State Championships
Trust me, Prove it,
Show me how good a Swimmer you really are
Dive, Streamline, Tumble Turn, Move It, Push it,
and make that State Qualifying Time
You have to Train Hard, Swim Hard, Think Hard and Win Hard,
to become a State Champion.

Verse 2.

Your swimming in the right direction
on the Long Journey to Success
At times you struggle through Pool and Gym Sessions
wondering whether its worth it
At times you appear to be heading in
the wrong direction a Superstar
Skipping training sessions, Thinking that you don't need to train.
But you're wrong - The Coach knows better.
And the Coach would say from the Pool Seck
WHO DO YOU THINK YOU ARE?
Do you think you are
Some kind of Superstar - that
doesn't need to train?
You have to Train Hard, Swim Hard, Think Hard, and Win Hard
To swim at the State Championships
Trust it, Prove it,
Show me how good a Swimmer you really are,
Dive, Streamline, Tumble Turn, Move, Push it,
and make that State Qualifying Time
You have to Train Hard, Swim Hard, Think Hard and Win Hard,
to become a State Champion.

Verse 3.

You must never lose sight of your goals,
You have to give a 100% effort at Training and Carnivals
if PB's and Qualifying times are to be achieved.
Never lose Control and learn from your errors
There is no time to learn at the State championships
There is only time to perform.
And the Coach would say from the Pool Deck,
WHO DO YOU THINK YOU ARE?
Do you think you are some kind of Superstar
that doesn't need to train?
you have to Train Hard, Swim Hard, Think Hard and Win Hard
to swim at the State Championships
Trust me and prove it
Show me how good a Swimmer
you really are.
Dive, Streamline, Tumble Turn, Move it, Push it,
and make that State Qualifying Time.
You have to Train Hard, Swim Hard, Think Hard and Win Hard
To become a State Champion.

Verse 4.

Day in Day out your journey alongthe
Black Line of the Pool Continues,
Butterfly, Backstroke, Breaststroke, Freestyle and I.M. Sets
done on Demand
At times the pain is intense
you start to go slow
and you want to give up
and the Coach would say from the Pool Deck
WHO DO YOU THINK YOU ARE?
Do you think you are some kind of Superstar
that doesn't need to train?
You have to train Hard, Swim Hard, Think Hard and Win Hard
to swim at the State Championships
Trust me and prove it
Show me how good a Swimmer
you really are
Dive, Streamline, Tumble Turn, Move it, Push it,
and make that State Qualifying time,
You have to Train Hard, Swim Hard, Think Hard and Win Hard
To become a State Champion

This ballard was written by Peter Nowlem from Mackay Masters

Importance of the Base continued from page 6

of periodization which involves working hard at times then easy at times.

Time: A minimum of 30 minutes continuous work is recommended to develop the base. For the beginner 15 minutes may be enough; for the fit/experienced athlete, I'd suggest 40 minutes as a minimum if in training. If you're training for long races (eg. 100k or 180k's on the bike, open water swim or a 42.2k marathon) you need much longer work. If you're using the work out for recovery 20 minutes will be fine.

We've seen the importance of base training in terms of physiological changes in heart and muscle and injury prevention. We've discussed the principles of F I T and the importance of progressing gradually in frequency, intensity, and time. These are principles of training that look good on paper and will develop your base. Once developed, the aim is to maintain these changes throughout the competition phase of the season when we're training harder and competing.

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Addressing Shoulder Problems

by Margie Barrett

As a health professional, it concerns me that I am seeing more senior athletes presenting with injuries in the overuse category. Swimmers classically present with a tendonitis of either the supraspinatus or long head of biceps muscles.

Master swimming coaches must take a greater responsibility to undertstand the causes of this problem, and what can be done to reduce its occurrence, as well as treatment options once it has occurred.

Much has been written on 'swimmers' shoulder'. However, most of this has been based on children and elite swimmers. It doesn't take into consideration that as we age most people have the following changes in posture:

1. a decrease in disc spaces due to a change in the ability of the dics to absorb water.

2. an increase in the thoracic spine's kyphotic curve, often as a result of changes in bone density.

3. a tendency for the neck to adopt a 'poked forward' position often ending up with a pronounced 'Dowager's Hump' in the lower neck/upper thoracic spine.

4. a gradual stiffening of the normal physiological and accessory movements of the spince and shoulder due to the aging process.

5. a tendency for the shoulders to become more rounded due to many causes eg.

- all our work has us reaching forward, working in sustained positons with arms forward
- gradual weakness occurs in the rhomboid and scapular depressor muscles
- previous injuries from other sports eg football, netball, hockey etc .... the list is endless

Thanks to AUSSI Qld for allowing us to reproduce this article from the Queensland Masters Coaching Newsletter Issue 2 December 1996

Stretching continued from page 7

progress to smaller ones. This allows individual specific or remedial stretches to be carried out more effectively.

2) Joint stretches such as lumbar rotation or rollovers follow the muscle stretches. Many athletes feel no effect with this stretch as they have not stretched groups such as the gluteals (bottom) or lumbar (lower back) muscles prior to attempting it. In addition, no stretch may be experienced in those of us who are extremely stiff and thus need increased muscular stretching prior to attempting it.

3) Nerve stretches Finally, the nervous system must be free to move under, over and through structures for us to feel genuinely "loose". Thus such stretches as slump and extended knee 'hamstring' stretches are employed to decrease tension in the nervous system. It is suggested that these stretches are done as oscillatory movements but sustained stretching maybe used in athletes who are neurally very tight. Three to five repeats of 15-20 oscillations is a good 'ball park' figure. This type of stretching requires individual prescription, supervision of technique and should not create pain!!

Some of this will be new to many of you. If not ,take "a pat on the back". If it is new, speak with your sports medicine professional/sports scientist and get yourself and yourself or your athletes up to speed on this highly relevant information. Good luck and let's all use our time effectively and enjoy injury-free competition.

Michael is one of Australia's leading sports physiotherapists and is currently the physio to the Australian Women's hockey team, Brisbane Broncos, and the all-conquering Queensland State of Origin team!

Reprinted with permission from THE MASTERS ATHLETE Issue 7 June 96

"DIPLOMACY:
THINKING TWICE BEFORE
SAYING NOTHING."

Dates to Remember

12-14th March1998
AUSSI National Swim
Hobart, Tasmania

19-30th June 1998
FINA World Masters Swimming Championships
Casablanca, Morocco

9-14th August 1998
World Masters Games Swimming
Portland, Oregon USA

31st Oct-1st Nov 1998
Asia Pacific Masters Games Swimming
Gold Coast, Queensland

11th-15th May 1999
AUSSI National Swim
Darwin, N.T.

Repetition: Drills for Skills

Perfect Practice Makes Perfect

by Steve Tarpinian

"Wax on, was off." That line was made famous in the movie, "The Karate Kid." I suggest you rent it if you have never seen it or if you have not seen it recently. The film is one of those classic psych-up, good-guy-gets-the-girl, triumphant under-dog movies that can help get you motivated to get to the pool and have a great workout.

In addition to the motivation factor, "The Karate Kid" shows how repetition of a movement develops skills to the highest levels. Swimming is not the only activity where repetition is one of the keys to improvment. Golf, tennis, martial arts and music are all examples of activities that require repeated movements and drills.

In our fast-paced world, it is common always to be looking for the new and/or faster and/or better method. While there is much to be said about new techniques and new approaches to improving your swimming, one fact remains steady: to learn a new skill, you need practice. There are no short cut.

A good friend of mine is an elite Masters runner and biathlete. Bob Cook owns the Runners Edge in Farmingdale, N.Y. Whenever I see bob, he asks me swimming questions. i can see dreams of triathlons and, maybe, the hawaii Ironman in Bob's eyes. As the years go by, these talks about swimming have become shorter and shorter, because I ask Bob when he plans on going to the pool! He always anwsers, "I guess I have to practice."

We laugh and I invite Bob to our local Masters practice. he knows that to become a better swimmer, he needs to practice (ie repetition). He does it in running and biking. He just has not made swimming a high-enough priority to get to the pool.

In the "Karate Kid" movie, the student made a request for coaching because learning karate was a high priority for him.

Good coaching is often nothing more than reminding swimmers of what they already know and giving them the tools (ie drills) to do it. Look at any skill type activity - you do not take one swim lesson, one golf lesson, one free throw shot. It is repetition that makes, teaches and refines skills. your best bet is to work with a coach whom you trust to indvidualize a drill set for you that accentuates your strengths and minimizes your flaws.

There are two drills I would like to suggest for swimmers of all levels. For many of you this will be old-hat. But I guarantee that 90% of us are not doing drills at all - or with much confidence- so, if this is new, dive in. If not, consider this your wake-up call to recommit and find that lifelong excitement that swimming holds for all of us.

TO LEARN A NEW SKILL, YOU NEED PRACTICE. THERE ARE NO SHORT CUTS .. REPETITION OF A MOVEMENT DEVELOPS SKILLS TO THE HIGHEST LEVELS.

There are literally hundreds of aspects of stroke improvement that one can work on. An overview of these is covered in many fine books on swimming. For the purposes of this articles, here are two freestyle drills that have proven to be helpful for all swimmers in our ten years of conducting swim clinics.

1. **Kick-on-side drill.** Some coaches give it different names, however, the results are the same. This drill promotes more swimming on your side. This is helpful in maintaining and establishing a good body position, reducing drag, improving long axis rotation and lengthening your stroke. No wonder this is the favourite drill of many coaches.

This drill is best performed with fins and done with six to ten kicks on a side before rotating over to the other side. My colleague, Peter Hursty, stresses to swimmers to try to have one goggle in the water and one out to promote good head position. Another reminder we tell swimmers is to rotate from the hips and feel the power that can be generated from there. Typically, two to three 100's per session of the kick-on-side drill is good.

2. **Fist drill.** This is one of the older, simpler, but still very effective drills. This drill helps teach you to bend the elbow at the beginning of the stroke, giving you more power with every pull. You simply swim with your hands in a fist. The lack of pulling surface promotes bending your elbow to utilize the forearm and access the strong muscles of the back.

Swim with fists for a length and a half, open up your hands for the last half length. Five to ten 50s per practice does the trick. Fins are not to be used in this drill since they would counter the lost speed of fist swimming, allowing you to swim with fists and drop the elbow.

Remember, "*perfect* practice makes perfect."

You might continue to do the same mistakes in many drills as in your regular swimming. This is where having some guidance by a coach is valuable. Once you know that you are practising the drills properly, you can have piece of mind to work them with confidence.

Over time, the drills will carry over into your swimming and become your new "natural" technique. This takes time, but be patient and remember, "Repetition is the mother of skill."

Reprinted from SWIM Magazine

AUSSI RESOURCE CENTRE

A great way to get your club together for a social night/fundraiser is to have a video night. Clubs who may not be able to swim all year round could use this to keep some continuity in their lay off period.

Items are available for the following hiring charges:

1 Video	1 Week $ 5.00	2 Weeks $8.00
2 Videos	1 Week $ 8.00	2 Weeks $12.00
3 Video	1 Week $10.00	2 Weeks$15.00

A bill will be forwarded to you with the goods (plus postage) and payment must be sent with the items, on their return.

Videos

- **Mark Tonelli Gold Medal Series** - Best for novices in that it is simplistic, non-the-less it is very well put together with good camera work and footage.
- **AUSSI Coaching Seminar - with Kirk Marks** - 40 minutes of theory and practical showing real AUSSI swimmers of all shapes and abilities.
- **Swim Easy with John Konrads.** 45 minutes. An in-depth analysis of freestyle the John Konrads way. Excellent visual images.
- **Swimming Breaststroke.** 19 minutes. Superb analysis of the strokes of Adrian Morehouse and Nick Gillingham, plus 5 minutes of Sam Riley.
- **The Athletic Institute Swimming Series** - Covers all strokes, starts and turns with progressive skills. A bit dated but excellent under water shots of good basic techniques. Well worth a look.
- **AUSSI Workshop - Tailoring a programme** - plus booklet. This worshop held in Tasmania features Anita Killmier.
- **Swimming Fastest III - John Trembley.** A video and book combination. A *must* for all coaches, teachers and swimmers.
- **"Swim Smarter, Swim Faster." I & II.** Richard Quick and Skip Kenny of the Stanford University take you through nearly two hours of stroke drills, techniques plus Starts, Turns and Finishes.
- **ASCA Conference - Masters Stream** - Adelaide 1992.
- **Masters Stroke Techniques.** A biomechanical analysis of the four strokes by John Leonard of ASCA, with demonstrations of drills by US Masters swimmers. 50 minutes.
- **Your backyard swimming pool is your home fitness centre** - as the name suggests, gives ideas to utilise your pool to full advantage.
- **Strength Training** - This 30 minutes video provides a comprehensive update on the methods and principles of strength training, i.e. Body Building, Isometrics, Maximal Weights, Eccentric exercises.

  Excellent for swimmers and coaches about to embark on a strength programme.
- **Stretching - Bob Anderson.** A really great selection of exercises demonstrating correct technique.
- **Food for Sport - featuring Karen Inge.** Very good!
- **Sunrice High Performance Eating Strategies,** - plus booklet. A good video made better by the booklet.
- **Every Second Counts** - Effective Time Management in Sports Training. Whilst this video is not specific to swimming it gives many good examples of how time is wasted in coaching. A good tool for staff workshops or self evaluation.
- **Visualisation** - Focusing Techniques and mental rehearsals are used extensively by all top athletes to enhance performance. This video gives a comprehensive look at the use of visualisation in sport through various case studies.
- **Media Matters** plus booklet - this is hired to you as a kit and is designed for individuals and voluntary groups involved in promoting fitness and healthy lifestyles in the community. It can be used to publicise and attract members, hence is ideal for AUSSI Clubs.
- **Exercise beats Arthritis** - A unique series of exercises set to music, designed to keep joints mobile.
- **Give it a Go!** - Coaching Athletes with disabilities

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Freestyle Drills

by Rowdy Gaines

The key to swimming fast freestyle is perfecting one's technique. In 1984 at the Olympic Games, I was no better than fifth when I stepped on the blocks. However, two important factors made it possible forme to win the gold medal in the 100 freestyle: my mental strength and my technique. The best sprinters (and distance swimmers) in the world are always trying to find a way to improve their technique.

Here is a series of drills that the Auburn swimmers and I do to help improve our strokes. We spend a substantial amount of time throughout the season working on these drills and many others. It is essential to do these types of drills consistently.

Finger Tip Drag Drill

This is an excellent drill to emphasize the high elbow. Notice that my fingertips come all the way into the pit of my underarm.

A bit of exaggeration, yes, but it really gets the swimmer to keep that inverted "V" in his stroke on the recovery. After the recovery, drag the fingertips lightly across the water keeping the wrist and arm completely relaxed (sort of like a pendulum on a clock) until the arm is fully extended out front. Be sure no to drop your elbow on entry.

Some swimmers have a tendency to swing their arms, and this is a good drill to keep the stroke "compact" and more streamlines.

Water Polo/Tarzan Drill

This is a good "hand speed" drill. Many sprinters will end up being too long on their stroke (not all of us can be Alex Popov).

Having your head out of the water quickens the "catch" to increase the pace. Remember: distance per stroke is critical in all phases of freestyle. But proper hip rotation and "fast hands" will give you added acceleration.

Notice the head is completely out of the water "Tarzan style." To maintain your head position, the hands stroke a little wider and in a more rapid motion. This provides the lift you need in your stroke in this drill.

The Tarzan drill should only be done for short distances (not more than 50 meters).

Hip Roll Drill

This is my favourite drill because it allows the swimmer to completely rotate the body from on side to the other, forcing the hips to roll and stretch.

Stroke to one side, hold your stroking hand out front and count to six, then rotate to the other side and again hold your stroking hand out front for a six count.

Then shorten the count to three for each side, then two, one, then a simple exaggeration of feeling your hips being involved with the power phase of the stroke.

The primary purpose is obviously the rolling of the hips, which is the source of the power in the freestyle.

Think of the fastest swimmers the world today - Alex Popov, Gary Hall Jr, Amy Van Dyken. What do they all have in common?

Like the three most important factors in real estate (location, location, location,) the answer is technique, technique, technique. They are able to manipulate the water better than their rivals.

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