

Swimming Strokes

Once the learner has mastered entries and exits, basic floatation and movement skills, the teacher can begin to bring together sets of movement patterns to begin developing "strokes".

This unit of study applies the biomechanical principles previously presented to teaching the four competitive strokes of swimming.



Teaching Sequence

"A swimming stroke is a set of arm, leg and breathing patterns defined by competitive rules."

Usually the learner will learn rudimentary Freestyle and Backstroke followed by Breaststroke, Life Saving Backstroke, Butterfly and Sidestroke in that order. Teachers may vary this depending on the Learner or their particular teaching philosophy.

A rationale for this sequence of strokes is Freestyle is swum on the front making it relatively easy to stop and stand. Buoyancy is maintained by the head turning to the side. It is the most popular and the fastest of all the strokes.

The ability to float on the back is a prerequisite skill for learners learning to turn their head and body to the side (as in Freestyle breathing) so Backstroke is taught in conjunction with Freestyle.

The kick, arm action and alternate timing all have some similarity with Freestyle.

Breaststroke is a more difficult stroke to master, especially the "frog" kick. The body position is at more of an angle than that of Freestyle, but it opens up underwater swimming, a paired or double arm and leg action. The learning of Breaststroke kick is usually done at the same time as the inverted Breaststroke kick that is used in Survival or Lifesaving Backstroke. Breaststroke is the most energy efficient competitive stroke as it has an underwater arm and leg recovery.

The other survival strokes Survival Backstroke and Sidestroke are also characterised by an underwater arm recovery and greater energy efficiency than strokes with an over the water recovery.

The Survival Backstroke action is basically swum on the back with a Breaststroke kick combined with the arms sculling around under the water out to the side. Many learners consider it as "Breaststroke on the back". Sometimes learners experiencing difficulty mastering the correct Breaststroke kick on the front will master the same kick on the back more readily. A variation on Survival Backstroke is Lifesaving Backstroke where the arms may lift singly or together out of the water with an inverted Breaststroke kick.(note - rules of pool lifesaving competitions for lifesaving backstroke require the hands to remain in the water) This style continues to be swum in some masters competitions in Backstroke events.

Only when Breaststroke is swum well, should learners be taught Sidestroke. If Sidestroke kick is mastered before Breaststroke kick, the learner may adopt the sidestroke scissor kick with Breaststroke or struggle for a longer period before achieving a correct Breaststroke kick.

Butterfly is not a stroke swum by choice and requires a degree of strength and an ability to swim technically well. With some understanding of floatation and movement skills, Butterfly is easy to swim if swum well, but is unforgiving if any part of the stroke is incorrect. The high-energy usage rate makes this stroke unsuitable for distance swimming, recreation or rescues. It is primarily a competitive swimming stroke.

The ability to swim from point A to point B is only part of the equation to building a complete swimmer. As stroke skills are acquired, other aquatic skills related to personal safety, survival and rescue for a variety of natural aquatic environments and circumstances must be taught e.g. entries and exits, swimming in currents and waves, with clothes on, surface diving, underwater swimming, recover from a fall in etc. These skills appear in the section related to water safety and survival skills.

Medley Swimming is examined in further depth in ASCTA and SAL coaching courses. It is sufficient for Teachers to know that the order for an individual medley is Butterfly, Backstroke, Breaststroke and Freestyle. An equal distance of each stroke must be swum and the rules of each stroke obeyed.

Medley relays commence with Backstroke, and then Butterfly, Breaststroke and Freestyle with each stroke swum equal distance by different swimmers.

Fault Identification and Correction

The majority of the faults seen by teachers can be traced back to the swimmer's poor body position and incorrect pathways of the hands particularly when extended out in front.

If a correct body angle is not maintained, the swimmer's inclination is to stroke quickly or swim to stay afloat. The water should do the work of holding the swimmer up! The swimmer should do the work of moving forward.

One technique for teachers to identify faults is to use "stroke models". This is where the teacher has a mental image of the desirable movement pattern and overlays this with what is evidenced from a swimmer. This mental image could be a composite of the desirable movements of different swimmers.

The teacher then "spots the differences" between the ideal image and what is seen. This will provide the teacher with a starting point to where faults may lie, remembering that some faults can be caused by an entirely different action. E.g., the head lifted will cause the feet to sink. In this example, a teacher telling a swimmer to lift

their feet up will not achieve any change. By asking the swimmer to put their head down, the feet will rise dissipating the fault that was evident. Even though a fault may be apparent, the cause of a fault is not always evident. Teachers may try various alterations to a swimmers stroke before determining the actual cause.

Another powerful tool for the teacher is observation. This can be in the form of reviewing footage of swimmers and comparing this to other swimmers, slow motion and benchmarking what is seen against a standard set of parameters for the stroke, or pool deck observation of the swimmer from the front, behind, side, above and below positions.

A commonly employed technique for correction is "overcorrection" E.g. if a swimmer is bending their knees too much in Freestyle kick, a teacher may ask the swimmer to "kick with their legs straight". The result is that the swimmer's legs will straighten somewhat, without going entirely straight. This modified result is actually what was desired though not what the teacher requested. If a teacher continues to ask the swimmer to "kick with your legs straight", the eventual result will be a straight-legged kick and this is not desirable. The skill of using overcorrection requires the teacher to stop reinforcing the directive once the swimmer has achieved the desired degree of modification.

Another corrective technique is to break the stroke down into parts and practice drills. A drill usually allows the swimmer to do a less complex activity and focus on one area of a stroke. E.g., using a kickboard to kick only, allows the swimmer to concentrate on their legs without the need to think of the arms or breathing. If each part can be done correctly and the muscles "patterned" to perform the action a certain way (correctly), when the parts are put together, the whole stroke should be modified in a desirable way.

Conversely, if a swimmer is allowed to swim without correction of a fault for a long period of time, incorrect patterning will make it harder to correct the ingrained fault.

To measure efficiency in stroke techniques, common techniques utilised by teachers are:

- counting the number of strokes done by one swimmer over a set distance and comparing this stroke count to other swimmers of a similar stature and age
- noting where the first hand is at the beginning of the stroke in comparison to a fixed point on the side of the pool and comparing this with where the hand is as it exits the water to commence recovery. This will show how much traction the swimmer is gaining each stroke
- recording the time of a swimmer over a certain distance and comparing this time to previous performances as well as the performance of other swimmers of a similar stature and age

Freestyle

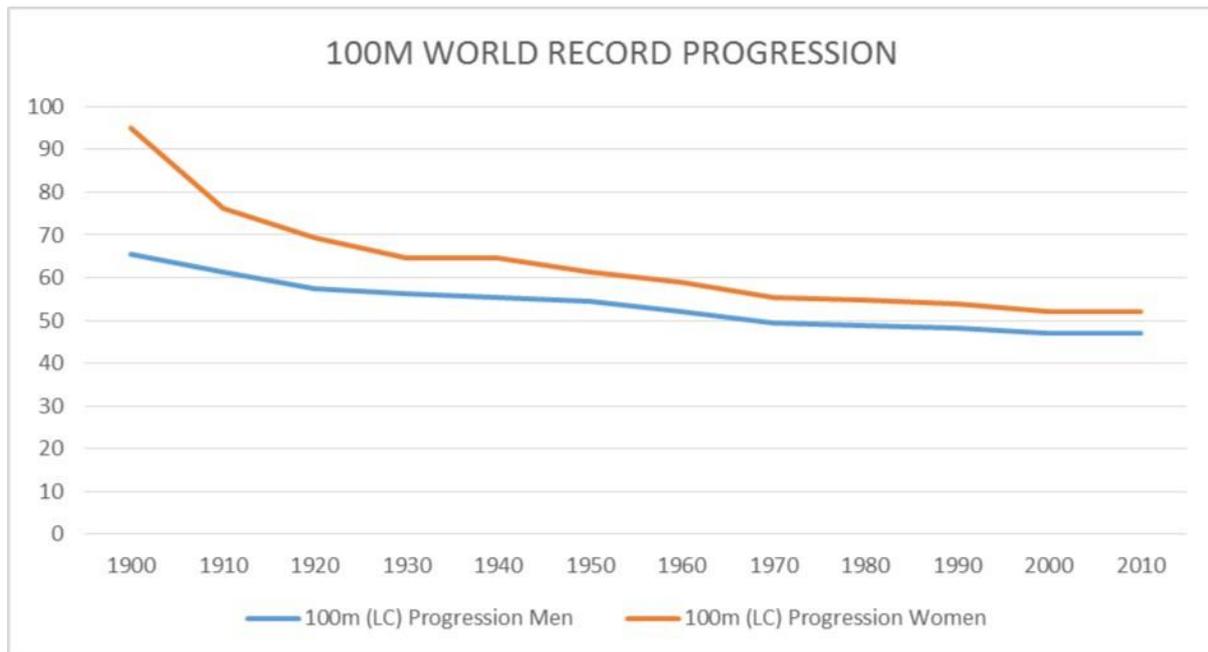
What most Australians refer to as Freestyle is "Australian Crawl" or "Front Crawl".

The front crawl action originally emanated from the South Sea Islands, but was introduced to the world by Australian Dick Cavill in 1902 when he swam in England. Europe adopted the style shortly thereafter and early records show Front Crawl swum in USA by 1904.

Improvements

Technically, the stroke has developed a long way since then, with modifications to improve streamlining, stroke mechanics and training technique leading to elite times for the 100 metres Freestyle reducing at a steady rate over the past century.

The chart indicates that the stroke has further potential for improvement.



Simplified Freestyle Rules

Freestyle can be any style of stroke, excepting that when swum in an Individual Medley or Medley Relay it must be a style other than Butterfly, Backstroke or Breaststroke.

Whilst the rules do allow any style to be swum, the accepted protocol is for the fastest style a swimmer knows of moving through the water to be used. This is generally the Front Crawl style hereafter referred to as Freestyle. The rules require that some part of the body must touch the wall at each turn and the finish.

Freestyle Skill Progressions

The ability to float and glide well is vital to acquiring good swimming skills.

Swimmers must continue to maintain good body position as drills and skills are undertaken.

The most important time when a Freestyle swimmer must have good buoyancy, balance and swim correctly is when they are breathing.

Here is a range of drills and skill progressions that could be used to teach Freestyle. Remember a learner may not have to go through all steps. Basic kicking and stroking drills were provided in the Buoyancy and Mobility section.

It is assumed the learner is now a swimmer with rudimentary alternate kicking and stroking skills.

Set A. Undertaken with no head turning to breathe. Learners to swim as far as they comfortably can and stand up.

1. Freestyle kick holding on to the back of the board with the face in
2. Freestyle kick with a kickboard, arms over the kickboard, hands holding on to the front
3. same as 1. and moving one hand around. Let go with one hand, moving it through the water under the body to the leg, lift out of the water and recover back on to the kickboard
4. same as 3. and using the other arm only
5. same as 1. and this time alternating arms. First one arm around, catch the kickboard, then the other arm around
6. same as 5. and using a smaller kickboard, a stick or catching thumbs using two fins
7. same as 6. and using one fin
8. same as 6. and using no fins
9. use arms and legs with no kickboard, and pretending that a kickboard is still held i.e. arms change over in front
10. as in 9. and swimming with long strokes, making as little splash as possible
as in 10. and using a snorkel to swim further

Set B. Introducing breathing once the arms stroke timing and the leg kicks are reasonably proficient.

1. standing in the water, hold on to the side of the pool with two hands, blow bubbles, then lift the head forward, open the mouth, take a breath in, place the face in the water and exhale through the mouth
2. as in 1. repeat for a number of times or set period to ensure that it is sustainable
3. as in 1. now turning the head to the side instead of lifting
4. as in 3. now this time place the hand down by the leg on the side to be turned to when breathing. The other hand continues to hold on

to the side. Teachers can also have Students attempt this drill turning to both left and right sides

5. standing in the water, hold on to the side of the pool with two hands. With the face in the water, stroke one arm around and catch the side, then repeat with the same arm. As the hand comes away from the side, begin to turn the head so that the head is turned out of the water by the time the hand reaches the top of the leg (about half way through the stroke). Take a breath and turn the head back into the water as the arm recovers over the water. Let the air gently trickle out once the face is in the water. Repeat several times. It is important to note that to develop sustainable breathing patterns the stroke must time with the breathing NOT the breathing with the stroke. I.e. the breath is not taken when the hand is by the leg, rather the swimmer must ensure the hand is by the leg when the breath is taken. This fine distinction will encourage the swimmer to take enough breath to continue to swim rather than take breaths when it is not necessary or to hurry their breath. A problem sometimes encountered is over-exhalation. Ensure the swimmer blows bubbles but not too many!
6. standing in the water, hold on to the side of the pool with two hands. With the face in the water, stroke one arm around and catch the side, then repeat with the other arm. As the first hand comes around take a breath and turn the head back into the water as the arm recovers over the water. When the other arm strokes leave the face in the water and exhale. One arm is the breathing stroke and one arm is the exhalation stroke. In learner terms - 1 arm breath, 1 arm bubbles!
7. as in 1. holding on to a kickboard and kicking with fins
8. as in 7. turning the head instead of lifting
9. as in 8. using one arm
10. as in 9. using two arms
11. as in 7. 8. 9. and 10. firstly using only one fin, then repeat the sequence with no fins still using a kickboard.
12. as in 7., 8., 9. and 10. with no fins with smaller kickboard and then no kickboard (swimming and breathing)
13. push off wall on the back and kick. Take a breath, and then roll on to the front and Freestyle till a breath is required. Stop and stand up

14. the same as 13 in reverse. Freestyle for a few strokes, then roll over on to the back and kick. Take some breathes. Stop and stand up
15. a combination of 13 and 14. Back kick, roll on to the front, swim freestyle, then roll onto the back and kick again. Too much practice of this drill will encourage "roll over" breathing, however it does allow for the less skilled swimmer to still achieve a breath while swimming and is a good safety skill for beginners to learn

Set C. Refining the arm stroke to improve timing of the breathing, better arm pull and variations in the stroke due to distance swum. These drills are not in a delivery sequence, but may be used by the Teacher in combination with a drill from Set A or B.

Swimming Freestyle with the head in various positions. E.g., right under the water and out of the water. This allows discovery of the ideal head position and the effect that lifting the head has on sinking the feet. In advanced learners, head lifting will encourage a faster and shorter stroke and will assist in breaking an over-taught catch up stroke habit. Sprinters need to swim up over the water and look forward more, have a higher head position and less "catch up" on the stroke. Starting with a high head position and gradually moving through a range of positions enables the swimmer to determine what is best for them. Distance swimmers hands catch up more in front, resulting in a flatter body position (as the centre of gravity is moved upwards the legs rise). This position requires less kicking which for a distance swimmer also equates to energy savings. Swimming with fins will also show the swimmer what adaptations will need to be made in body position when moving at a faster speed

Kick with a variety of kicking combinations. Try Breaststroke kick and discover that every time the knees are bent the swimmer slows, the body is not able to turn to the side as easily and breathing is more difficult. Try dolphin kicking and discover that the up and down movement increases resistance, is more strenuous and can slow swimming speed. Discovering what does not work will lead to the conclusion that a constant body position with the legs not bending much will allow for an energy efficient fast stroke

Kick on the side with one arm by the side and one arm extended over the hip. This can be aided by either holding a kickboard or not, with or without fins. This allows the swimmer to feel greater pressure on the feet due to the volume of water the feet are moving through. Kicking up and down usually finds little resistance near the surface

Pool Buoy/ Pullboard. Using a pullboard allows for practice of arm movement only and replaces the need to kick. Some faults will initially become more apparent to the Teacher and swimmer as the kick is no longer masking or counteracting faults. This increased awareness and a perseverance in practice will improve streamlining and encourage correct timing of the arms. Make sure that the pullboard is an appropriate size to the body weight of the swimmer. The average child needs a pullboard half the adult size

Paddles. Paddles placed on the hands enhance the catch with the hands and are useful with more advanced swimmers. Similar to pullboards, ensure that the size of the paddle is only slightly larger than the hand. An oversized paddle will strain the shoulders and cause the elbow to drop on during the pull

Arm drills are used to encourage streamlining, short fast recovery and a long slower, gradually accelerating underwater arm pull. Drills such as:

Chicken wings. Doing catch-up drill with a kickboard, the swimmer follows the usual underwater arm pattern, but when the hand reaches the leg, the thumb is trailed along the side of the body, up under the arm pit, then through to stretch out in front. This encourages a high elbow recovery

Fat chicken wings or finger trails. Doing the catch up drill, when the hands reach the legs, the elbow is lifted to recover the arm. The arms are brought out to the side and around to the front in a wide "chicken wing" fashion with the finger tips trailing through the water during the whole of the recovery

Wall drill. If a swimmer is swimming with their arms too wide on the recovery, instruct the swimmer to swim close to the wall thus limiting the amount of space available for a wide recovery. An alternate way of achieving this is to place two lane ropes a small

distance apart and have the swimmer swim fat chicken wings without touching the ropes. The Teachers can vary the width of the ropes to suit the desired change in the width of the swimmer's arm recovery

Fist swimming. Swimming with the fists clenched ("Boxing Freestyle") emphasizes the role that the hand and arm plays in the pull

Breathing combinations. Breathing for a distance every, 2, 3, 4, 5, 6, 7 strokes or as far as you comfortably can on one breath encourages sprinting and a shorter faster stroke, balanced stroking and an ability to breathe to either side. A variation is to breathe looking to only one side of the pool whether swimming up or back!

Side streamlining drill/two-sided breathing. Glide on one side (one hand forwards and one hand back) and kick for 6 kicks. Roll to the front and on to the other side as half a stroke is done with each hand (the hand by the leg comes over the water to the front and the forward hand pulls down to the leg). This encourages a strong kick, streamlining and a buoyant position when breathing

Snorkel swimming. Swimming a distance without turning the head to breathe allows the swimmer to balance the body roll evenly on both sides and swim without the un-stabilising affect sometimes caused by an incorrect or unbalanced head turn or roll of the shoulder. The drill can be undertaken with or without fins using either a side snorkel or a front - centre snorkel

Ideal Freestyle

The swimmer is positioned horizontally on the front, with the face in the water looking forward underneath the surface. A continuous alternating up and down kicking movement is done with the legs, whilst the arms move alternately around in a long stroking action commencing out in front on the surface of the water, moving down underneath the nose and belly button to the side and then out of the water and around over the surface of the water to recover to the front.

The head is turned smoothly to the side between arm strokes until the mouth clears the water for a breath to be taken, then rotates back into the water again.

To evaluate Freestyle, note the swimmer's overall confidence, smoothness and fluidity in performing the stroke. Look for:

Kicking

- economical use of the legs
- a continuous 2, 4 or 6 kicks per arm cycle. In teaching Freestyle kick, Teachers generally encourage a fast 6 beat kick to provide learners with better support
- the kick emanating from the hips through the knees to cause a whipping action of the lower legs and feet, with the heels just breaking the surface of the water. The legs will kick up and down as well as some side to side kicking, depending on the roll of the swimmer's torso. Emphasis is on the down-beat of kick

Arms

- a smooth fluidity as one arm takes over from the other
- fingers held loosely together creating a paddle
- the hands entering first with the thumb and index finger, in front of the shoulders at about where the wrist is on a full arm stretch, then fully extending forward under the surface of the water, before pressing down and back towards the centre line of the body, passing under the sternum then extending down and out past the lower hips. About half way through the underwater stroke, the elbows will attain a bend of around 90 - 110 degrees. The arms should have a symmetrical pattern. The back of the hand faces the direction of travel as much as possible to attain effective use of lift forces generated
- the elbows being kept higher than the arms throughout the stroke – both over the water and under the water except as mentioned below a la Michael Klim

- the arms recover as though "the hand is coming out of a pocket" with the shoulder and elbow assisting to lift the hand clear of the water and then swinging the arm out to the side and around to the front, across the surface of the water. (see Fig 3. – Arm pathway 1). The momentum of the push back combined with a gradual change in direction of the hand as the arm fully extends to the hips means the arm recovers at a much faster speed than the speed of the underwater part of the stroke. The increased speed is also due to reduced resistance experienced by the arm moving through air. The elbow usually recovers higher than the hand though if the latter part of the underwater stroke is deep there may be a tendency to recover the arm "over" rather than "around" because of the upward momentum. This will lead to an alternate pathway where the hand is higher than the elbow such as swum by Australian, former 100 metre Freestyle world record holder, Michael Klim (See Fig 3. – alternate pathway)
- a gradual acceleration of the speed of the arms from the commencement of the downward press out in front. Whilst one hand is moving relatively slowly out in front the other arm's rapid speed allows it to nearly catch up to the other hand, giving the appearance when swimming at slower speeds that one hand is apparently overlapping with the other out in front. At faster stroking speeds the hands move further apart as more effort by the swimmer is put into lifting the body higher in the water to decrease resistance

Body position

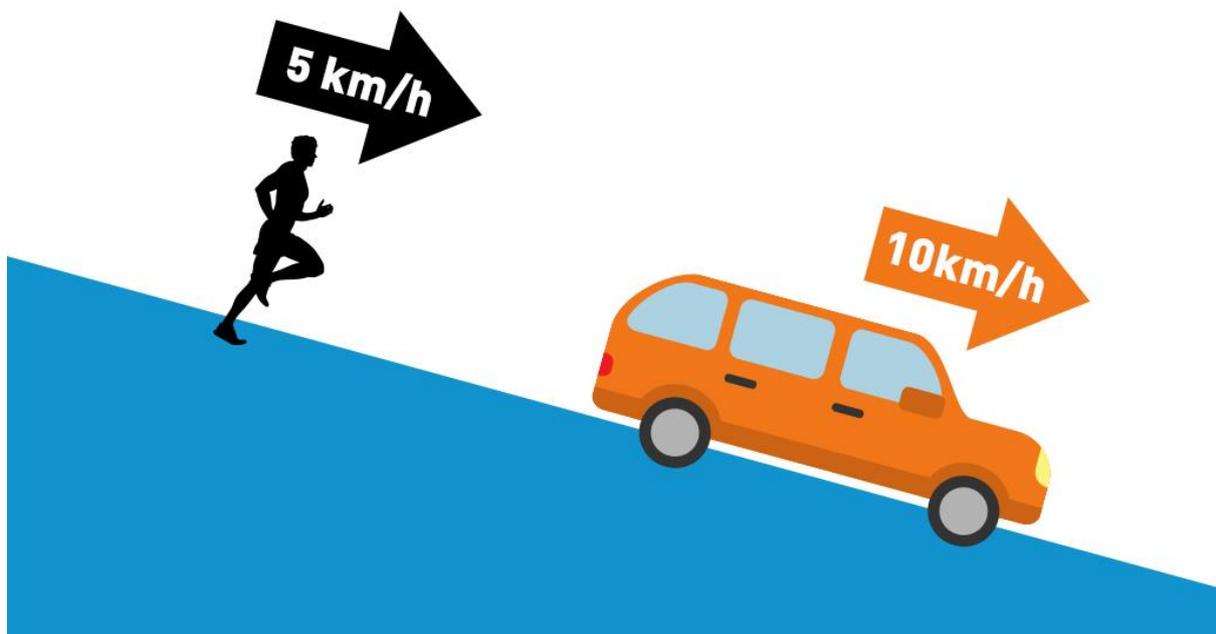
- a reasonably horizontal body position with the head looking comfortably forwards
- each half of the body balanced with a similar degree of roll to either side

Breathing

- only a small turn of the head and body smoothly to the side to achieve a breath. Approximately the same amount of the head stays in the water during the whole breathing cycle

- an ease of breathing without undue hurry or pausing. Inhalation is made through the mouth. Exhalation begins as soon as the mouth is back in the water. Sufficient air should be exhaled so that when the mouth next clears the water, the swimmer immediately begins to inhale again
- the head turned in time with the arms. The head turns just after the opposing hand enters the water

Freestyle Faults and Corrections



Kicking. If the legs fail to stay in a streamlined position within the line of the body and just under the surface of the water, resistance will increase. Freestyle kicking counter-balances the arms stroke and raises the legs towards the surface. The arms pull a swimmer's body through the water faster than the legs kicking push the swimmer, kicking does not provide propulsion, rather aids in decreasing resistance, thus allowing the swimmer to move forward faster. This is similar to a car rolling down a hill at 10 kilometres per hour with someone running behind at 5 kilometres per hour trying to push the car. (Image 1)

The swimmer should place their head further down in the water and ensure that the hands are overlapping in front. This will move the centre of gravity up and raise their leg position. If doing kicking drills

with a kickboard, move the kickboard downwards towards the centre of gravity to raise the legs. Beginners can also gain advantage by using larger flotation items such as body boards, noodles or float mats.

Legs splay apart or one leg bends up when breathing. If the hands come across the centre line during the underwater pull phase of the stroke, the legs will counter this by moving apart thus counteracting the body roll caused by the arm across the body. Fault correction should focus on correcting the hand and arm pathways especially in the recovery and hand entry into the water. This will provide a resultant improvement in this intermittent leg fault.

As discussed in resistances, for every increment increase in speed there is a fourfold increase in resistance. Using fins when kicking or swimming increases the forward speed and makes the swimmer more aware of any "lumps and bumps" sticking out. The use of fins will adapt the swimmer to a better kicking form, breaking the previous patterning. For beginners one fin is sufficient, as it can be difficult to stand up. Fins also encourage streamlining and learning style adaptations for faster swimming.

Backstroke

Basically, any arm and leg action on the back is permissible. The arms and legs may use an alternate action or a double arm backstroke with either an alternating up and down flutter kick or an inverted Breaststroke kick.

Survival or Lifesaving Backstroke is dealt with separately in Survival strokes.

Simplified Backstroke Rules

Competitively, swimmers must commence the start with their feet on the wall (not over a skim gutter or the top of the wall) and push off on their back, remain on their back and complete the race on their back. At turns, it is permissible to roll onto the front so long that

the turn commences immediately without forward propulsion whilst on the front.

The conventional style of Backstroke is similar to Freestyle with an alternate arm and leg action, but swum on the back with uninterrupted breathing.

Ideal Backstroke

Body Position: The head should remain still whilst the body rotates from side to side along a longitudinal axis at a slight angle to the surface of the water. The body rotation helps improve the flow of the water over the body thus decreasing resistance. The body is in a position similar to "lying on a water bed with a pillow behind the head". The back half of the head may be in the water but the head is tilted slightly forwards. This way any water splashing on to the face goes "past the nose rather than into it!"

Should a swimmer need to look around, they should moving their eyes rather than move the head. The head is like a steering wheel. When the head turns, the rest of the body will follow, causing the swimmer to swim "off line". A Freestyle swimmer who moves the head off the longitudinal axis also does the same.

Arms: The arms remain opposite each other throughout the whole stroke. This means as the arms pass through checkpoints such as, as one hand enters the other exits the water or when one arm is half way through the recovery the other is half way through the pull/press. This action is aided by the shoulders rotating with the arms.

The hand enters the water little finger first in front of, or just wider than the shoulders with the upper arm brushing the ear as it passes. Aided by the shoulder rolling down, the hand then continues the pathway down deep to where the arm starts to gain traction and lever the swimmer forward. Similar to Freestyle, about half way through the underwater arm stroke the elbow attains maximum bend of about 90 degrees. The arms then proceed to press or push down to the leg. The hand then exits wrist or thumb*

with the arm recovering high over the centre of the body. * a point often debated by coaches and teachers and yet to be resolved!

Somewhere in the arm recovery, the hand will rotate so the palm faces outwards positioning the little finger to enter the water first.

Legs: The leg action is a continuous kick, deeper in the water than Freestyle and with an emphasis on the up kick. The toes just break the surface of the water whilst the hips and knees should remain just below the surface. The kick emanates from the hips with relaxed ankles and knees flexing or bending on the downbeat and straightening on the forceful upbeat.

Timing: Unlike Freestyle where the arms catch up to each other, the arms in Backstroke stay opposite each other due to there being a fast high arm recovery and a relatively slow small arm pull. This is due to the inflexibility of the human body in this back position.

In order to attain good traction the arm must be deep on the pull. To do this, the shoulder on the pulling side must also roll down into the water. The result is that the opposing shoulder rises up out of the water. Whilst the body rolling assists the arms lift out and pull, the legs are counteracting this roll and keeping the body balanced. Assisting this is the head, which remains still.

Backstroke Skill Progressions

Set A. Buoyancy and kicking drills

- The back kick section in water familiarization, buoyancy and mobility skills has a range of elementary drills for the Backstroke swimmer. Back float and kicking on the back are two skills that a swimmer should be capable of if they are to develop good confidence in the water.
- Floating with an appropriate sized pullboard between the legs will assist in correcting body angle. (too large a pullboard will raise the torso too high) If the swimmer sits up (like sitting in an armchair) or bends in the middle (like a banana) the pullboard stops the legs from sinking but forces the legs in the air causing instability. **The swimmer learns to:**

- press upwards in the middle (bend backwards)
- push the feet down into the water
- float better
- become more stable
- Kicking with the aid of a kickboard placed over the chest, allows for easy recovery to a standing position. If the kickboard is held away from the body and placed over the knees, this will assist in stopping the knees bending and breaking the surface of the water.
- Kicking with one or two fins will enable a faster speed and promote a more streamlined body position.

Set B. Arm drills

Because of prior conditioning from Freestyle swimming, some swimmers initially have difficulty getting their arms to go around in the correct direction. Later faults usually result from incorrect body position.

- The swimmer holds on to a kickboard fingers on top, thumbs under. Push the kickboard away from the body. Walk backwards through the water. Whilst walking, one hand lets go and, keeping the arm outstretched, raises up from the water, above the head, down past the leg and back to the kickboard. Repeat with the other hand.
- Squat down in the water, until the shoulders are level with the surface. Repeat the above drill with a kickboard. This can also be done lying back in the water but still walking.
- As with drill 1. now floating on the back, kicking with or without fins instead of walking backward.
- Double-arm Backstroke. This is difficult to do because of the flexibility required to get both arms in the water at the same time. The rationale for the drill is that as the arms recover together, the swimmer must kick harder, developing a stronger kick. The pathway where the hands touch on the recovery is the pathway each arm must follow when alternate Backstroke arm strokes are used.

Set C. Stroke drills. Remember that a correct body position must be maintained whilst undertaking these drills.

- **Pull.** Using a Pullboard, swim Backstroke. If the swimmer sits up at all, the feet will stick out of the water and the body becomes unstable. The swimmer is encouraged to press the feet down into the water, causing the hips to rise and the body to adopt a more streamlined attitude.
- **Paddles.** A reminder that Backstroke swimmers cannot see where they are swimming, so using paddles with advanced learners requires good separation of swimmers. Swimming one way then stopping is a recommended safety strategy. Paddles encourage the correct hand entry (or little finger first) a good pitch of the hand throughout the underwater pull and press followed by a relaxed wrist first recovery out of the water.
- **Fins.** Fins (or one fin) aid streamlining and encourages a smooth stroke pattern with an ideal leg kicking action. The stroke entry point will be more controlled and the catch phase at the beginning of the stroke is also improved. With fins, the stroke count will be reduced. It is not desirable to have swimmers impacting on the wall at speed. Therefore, a safety strategy of ceasing to swim once the flags or some other indicator is reached and just kicking to the wall with one arm extended is recommended.
- **Checkpoints.** Do 6 kicks on the back with one arm extended and one arm by the side. After 6 kicks change the arms by doing half an arm stroke with each i.e. the arm extended comes through the water to the side and the arm by the side recovers over the water to the front. Kick whilst the arms are changing but do not worry about counting whilst arms are moving only whilst arms are stopped. After six kicks without moving the arms, change again. Once this skill is mastered, modify the drill to "3 kicks change" then "no kicks change". This advanced drill encourages arms opposite thus better stroke timing and promotes an improved shoulder roll with a stronger pull.

Swimmers should know how to utilise the backstroke flags to count the strokes to the end of the pool and thus know where the wall is without looking around. Swim from beyond the flags towards the

wall. When the swimmer sees the flags, they should commence counting the strokes they do, whilst continuing to swim "normally". This will give the swimmer a stroke count from the flags to the wall. Teachers should warn swimmers that as they improve their stroke, grow in size or swim faster, that this stroke number might change to a lesser number.

The Backstroke stroke count to the wall may vary due to:

- the height of the flags above water
- the angle of the swimmers head changing when the flags are seen
- variations in the distance from the flags to the wall

This is why, before competition, Backstroke swimmers should check out the competition pool for these subtle differences.

Backstroke Faults and Corrections

The maintenance of a good streamlined body position is vital to learning correct Backstroke technique. If a learner lifts the head or sits up in the water, this causes the legs to sink, the arms to enter wide and a myriad of other faults to develop. In the more advanced Backstroker, swimming crooked or not gaining a good catch at the beginning of the stroke appear to be the most prevalent faults.

Sitting up/ falling legs: The hips will sink when swimming if the arms are pausing by the legs. This can be due to the hand following the incorrect pathway, entering wide and getting to beside the legs before they should, causing one hand to catch up to the other. Swimming with both hands by the legs has lowered the centre of gravity away from the centre of buoyancy and thus the hips and feet sink.

The swimmer then attempts to raise the legs by "lifting" the feet causing an incorrect kick and further cause the legs to sink. The swimmer should be taken back to floating drills, adding kicking

whilst maintaining body position then adding arms with body position still correct.

Sitting up also makes it impossible for the hand to enter the water at full stretch above the shoulders. The swimmer compensates by doing “windscreen wipers”. This is where the hand comes way across the centre line of the body, the arms swipe above the face with the elbows bent, and then the hand enters the water wide of the shoulders. To compensate for the additional body roll, the kick is characterised by a large knee bend with the knees drawn up towards the hips.

Once a correct body position is attained, the kick will be up and down with the feet and knees under the water and only a small amount of knee bend. The arms will enter above the shoulders and pull to the hips, then recover with a high arm reaching upwards over the centreline of the body.

If the arms recover wide the hand entry will be further across in front of the head or in some cases the opposite shoulder causing the body to “snake”, the hips and feet to sway. Effectively the swimmer will “swim 28 metres to get to the other end of a 25 metre pool”. Drills to direct focus on altering the pathway of the arms are to:

- place at arm reach height above the swimmer the backstroke flags, a line of string or the Teacher’s hand and have swimmers touch the flags/string/hand with each stroke. Ensure that the arm brushes the swimmer’s ear and enters above the shoulders then pulls through the water and exits by the leg

- swim with a pullboard. This will increase the swimmers awareness of the sway and encourage streamlining

If the arms are not directly opposite, the swimmer may start to “bob up and down” or “bounce” as a result of having two hands in the air at the same time. The weight of two arms out of the water causes slight sinking. Drills should alter arm patterning and improve the pull and the recovery whilst maintaining good body position. E.g.

- 6 kick change. The swimmer glides on the back, kicking, with one arm outstretched at the entry point above the shoulders

and the other at the exit point by the legs. After six kicks in this position, the arms stroke until they reach the opposite point, (i.e. half a stroke each) 6 kicks are then done with the arms stationary. Continue to repeat the sequence. By having these checkpoints, the arms and shoulder roll will synchronise and maintain opposition

- Cheating drill. This can be done three ways. Use either the wall, an anti turbulent lane rope or a rope under the water. The swimmer backstrokes slowly using either the arm nearest the wall/rope or both arms. As the arm enters the water, the swimmer catches the wall/rope and pulls along (cheating). This encourages a bent arm underwater pull thus improving the timing of the two arms in relation to each other. This drill can also cause a dropped elbow so caution should be taken to ensure the pull is initiated from the shoulder and not the elbow. (make sure the lane rope is free of damaged floats and broken wire)

Crooked swimming is caused from one or a combination of three actions.

- Head position. If the head is off centre or tilted to one side the swimmer will veer towards that side. Observe a swimmer backstroking towards the wall and then start to look around. They then swim off to that side. The head should be straight in line with the body. Observe the swimmer from above, underneath, behind and the side to ensure the body is laterally straight. The head should be kept still, with the eyes moving to look for reference points. Vision is enhanced if the swimmer maintains the back of the head down in the water, but with the chin slightly tucked in (as though a pillow is behind the head)

- Kick. Both legs should kick with equal amounts of bend, height and effort. If one leg kicks more than another it is like “walking around in circles because one leg is longer than the other”

- Arm Stroke. If one arm pulls stronger than the other pulls, or takes a longer stroke than the other takes, this imbalance will send the swimmer on a tangent towards the weaker side. Teachers should check for an even and balanced stroke with both arms from a range of viewpoints

Which one? One method of determining which is the cause of the fault is by isolating the kick or the arms and seeing if the swimmer still goes crooked. Try:

- kicking with the hands above the head
- backstroking with a pullboard
- swimming with the eyes shut for a set number of strokes (so that the swimmer does not swim into the wall).

If the swimmer can go straight whilst kicking or with a pullboard, then it indicates the likelihood that the other segment of the stroke is the cause. Sometimes it can be an imbalance of both or all three.

In advanced swimmers, swimming with the eyes shut stops the swimmer from compensating as they usually do to correct themselves. E.g. If a faulty kick is pushing the swimmer to one side, the swimmer may compensate by deliberately generating an imbalance in the arms resulting in a straight-line backstroke. Eyes shut or goggles blacked out will cause the swimmer to backstroke naturally and for faults previously masked to become known.

Breaststroke

Breaststroke is governed by more rules than any other stroke. Historically it is the oldest stroke with records dating back to Before Christ.

So many beginners refer to this stroke as the "Frog Stroke" even though many may never have seen a frog swim!

The underwater arm recovery, rather than over the water recovery with Freestyle, Backstroke and Butterfly means that Breaststroke is the slowest of the four elite competitive strokes.

Unlike the other competitive strokes where the arms generate most of the propulsion, Breaststroke is powered more by the leg kick, which is in effect a sculling action.

Simplified Breaststroke Rules

The arms and legs must go around together in a mirror image paired action, staying in the same horizontal plane. The rules allow for the recovery of the arms to be under or on the water but not out of the water and permit the feet to break the surface of the water as no advantage is gained by this action. This means for each arm stroke there will be a corresponding kick.

Turn the feet outside the line of the legs. The backward propulsive phase of the kick must be done with the inside of the lower legs and the insteps or soles of the feet.

In competitive racing, the first stroke after the start or the turn may be one full underwater stroke (and one kick) with the head breaking the surface before the inward part of the second stroke commences.

At some stage during each arm and leg cycle excepting the first stroke after the start and each turn, some part of the head must break the surface of the water.

At the turn and the finish, the hands must touch the wall together at the same time.

Ideal Breaststroke

Body position: By tilting the head and looking forward, the feet can be kept below the surface. This head tilt causes the body to angle downwards more than any other stroke increasing resistance forces.

The newer variations of Breaststroke tend to have the head and hips undulating or teetering up and down as the legs kick. As the legs are drawn up towards the buttocks, the hips drop and as the legs straighten the hips rise to the surface. This transferring of energy from the body helps put more drive into the kick.

Arms: The pathway of the arms like all other strokes is characterised by a sudden change in direction when the hands are out in front. It is important that the hands do not make a sudden change in direction as they approach the chest as this slows the recovery. The hands start slowly and gradually accelerate throughout the stroke, attaining maximum speed on the reach

forward. The hands stay out in front of the shoulders at all times excepting on the start and turn when one longer stroke underwater is permitted. The timing and stroke aspects of this stroke are dealt with separately later in this chapter.

Timing: As the arms commence the inwards part of the stroke, the feet begin to draw up towards the buttocks. The hands and arms are well into the recovery as the feet press away from the buttocks and the legs begin their propulsive phase.

Breaststroke Skill Progressions

The undulating rocking of the body in Breaststroke is necessary to enable the kick to be completed whilst keeping the feet in the water. The motion also enables the mouth to clear the water for a breath. Drills should usually replicate this motion.

Kicking. First attempts at kicking are usually done in a controlled way so that correct patterning occurs.

On land. Learners sit on a kickboard on the ground with the Teacher facing them in a similar position. The Teacher talks through the steps of the kick with a demonstration and learners mimicking each phase. Phase one, sitting with the legs together and extended, drawing the heels up towards the buttocks. Phase two, once the feet have been drawn up, turn the knees out and the feet away from each other. Phase three, kick around in a circle with the legs finishing back in the start position i.e. straight and together. This drill enables the learners to see what their legs are doing. In some rare cases, the direction of the learner's feet may be incorrect. In this case, mark the pathway and direction arrows on the pool deck with chalk and permit the learners to follow the marks with their feet. As the knees are drawn towards the chest in this drill and this is undesirable in a correct kick, this drill should only be used sparingly as an introduction to the following drills. A similar drill, but with the variation of the Student sitting in a chair, will decrease the lifting of the knees to the chest

Lying on the edge of the pool, a table or bench seat with the legs from the hips down, hanging over the edge. The learner moves their

legs with the Teacher assisting and guiding the feet. The Teacher should do this in such a way that the learner is actually pushing against the Teachers hands rather than passively relaxing their muscles and letting the Teacher do all the movement. Do not have learner lie fully on the pool deck or with their legs in contact with a surface as they will be unable to turn the knees out and get the feet turned out.

The same drill as above can be undertaken with the learner lying on the pool deck with their legs hanging over the pool edge into the water with no assistance from the Teacher (pool design permitting).

In the water, learners should make first attempts holding on to the wall with one hand on the edge and the other hand with fingers pointing downwards (as shown on images above) levering the body towards the surface. A mirror held in front of the swimmer may also enhance their ability to grasp the concept by actually being able to see what is occurring behind them.

Once the skill is mastered on the wall of the pool, the learner can then progress to first attempts on a large kickboard positioned under the front half of the body. The kickboard should be positioned in such a manner that a floating buoyant equilibrium with the head out of the water and the feet about 30 centimetres under the water is attained. The swimmer can thus concentrate on the kicking pathway without fear that the feet will sink. The three phases of the kick should be emphasized. Phase one – the feet are drawn together up to the buttocks slowly. Phase two - the feet (and knees) are turned out. Phase three – the feet forcibly go around and back as the legs straighten. The variation in the speed between the kick and the leg recovery is important to efficient kicking from a very early stage.

As the kick improves in speed and efficiency, the kickboard can be moved further out to the front and the size of the kickboard reduced.

Variations of kicking on the kickboard include:-

- holding on to the back of the kickboard, fingers on top and thumbs underneath, do Breaststroke kick. As the knees bend, drop the hips and raise the shoulders so that the head rises out of the water. As the legs kick and straighten, allow the hips to rise and the shoulders

to drop. Make sure the head continues to look forwards under the kickboard when the face is in the water and over the kickboard when the face is out

- arms over the top of the kickboard, holding on to the leading edge of the kickboard, face out the whole time. Draw the feet up slowly, whip the feet together fast, and glide at the end of each kick
- Without the kickboard, do the first drill described in 6 – i.e. kicking and breathing with the hands in front the whole time. Variations on this drill are:
- to do the kick with the hands down by the side. As the knees bend the hips drop, head and shoulders rise and a breath is taken (frog drill)
- same as the previous drill and as the feet are drawn up, the hands touch the heels. This ensures the feet are drawn up sufficiently

Arms.

As described in drill 6 previously, kicking and breathing can be developed without the need to use the arms. The arms basically assist the swimmer to raise the shoulders to get the face clear of the water for a breath. If the swimmer can do this drill, it is simply a matter of attempting a small stroke that fits in with the legs and gradually increasing the size of the stroke scull whilst keeping it comfortable with the kick. It will be evident when the arm scull is too big as the legs will be idle for a period and the swimmer will start to bob up and down more. Ensure that the arm pathway continues to have gradual change in direction when the hands approach the chest with a more sudden change in direction after the hands have stretched out in front.

Other drills to enhance arms stroking are:-

- Breaststroke pull. Breaststroke pull is not usually undertaken with a buoyancy aid as this promotes an incorrect body position. Rather, the legs should remain together with the toes pointed with the knees bending and straightening without the swimmer gaining any propulsion from the legs. The body and arms moving as usual. This will strengthen the arm pull.
- a further variation of drill 1. (above) is for the swimmer to do a normal stroke and kick, followed by a pull stroke. Thus, it is really

two arms strokes to one leg kick, and again promotes use of the arms.

- an alternate variation is two kick to one arm stroke. The first cycle is a normal stroke, then the arms are kept in front whilst a second kick and breath are taken. This promotes the stretch of the arms in front after the kick. A further variation is the this skill done underwater, promoting the drive down and forwards after the breath.
- push off and glide. When a tap is heard, swimmers do one arm stroke, kick and breath, and then glide again till the next tap. Sound travels further and faster underwater. The tapping sound can be generated by placing a backstroke pole in the water and gently tapping it with another piece of metal or wood. This enables the Teacher to control the glide and stretch of the arms in front. The drill can also be attempted with swimmers controlling the glide with a 1-2-3 count whilst the hands are in front (it is surprising how fast some swimmers can count!).

Underwater Breaststroke: Underwater Breaststroke can be used in competition for the one stroke underwater allowed by the rules on the start and after each turn. In addition, it is a useful skill to have for search and recovery rescues, surfing, and safety (such as escaping from a burning boat). There are two main types of underwater Breaststroke – search pattern and distance.

Search pattern requires the swimmer to feel with their hands as they go and to search an area thoroughly. The distance travelled is not important. Usually this is swum with a head down angle, a small weak kick and a wide arm stroke.

Distance Breaststroke aims to take the swimmer as far as efficiently possible on each stroke. The arm stroke is a long "key hole pull" similar to the underwater phase of the Butterfly arm stroke with the hands finishing by the legs.

Once the hands are by the legs, there is a long glide, and then the legs do a full complete kick as the arms recover along the front of the body.

There is a much shorter pause once the arms are outstretched which is about the same time as the kick finishes.

If the stroke is used for underwater swimming, the cycle is repeated. Proficient underwater swimmers still utilise the pauses at the end of the pull and the arm recovery as these improve the stroke efficiency and saves on energy usage thus prolonging the ability to "stay under".

Breaststroke Faults and Corrections



As with all other strokes, to learn Breaststroke well requires the learner to maintain a good body position. Body position in Breaststroke changes throughout the stroke and is controlled by the movement of the hips and shoulders causing a rocking motion of the body. This results in the head popping out of the water once each stroke and kick cycle. As most propulsion in the stroke is from the legs, emphasis in acquiring skills and developing an efficient stroke should focus firstly on the legs. A good body motion combined with a strong kick will promote efficient arm technique much more readily.

Kick

Foot turned in /whip kick. The feet have to be turned out on the backward phase (when the feet move away from the butt) of the kick in order to gain propulsion and maximize the use of lift forces and water friction. To turn the feet out the legs must pivot out. This is achieved by rotating at the hips, as the hip joint is a ball and socket joint. Being hinge joints, the knees are not capable of providing the ability to turn the feet. If one knee is turned in, then the foot will turn in with the result that the foot loses traction as the propulsive phase of the kick occurs. The problem is usually identified as a "leg problem" but often the kick is done with a foot

turned in, as this assists in keeping the legs up if they are sinking, especially if drills on a kickboard are being done. All kickboard drills undertaken should have the kickboard position adjusted to ensure the body is on the surface with the feet under the water. This may mean, similar to Freestyle that the swimmer's body is positioned on the kickboard, or a body board is used in the first few attempts.

Other drills used to correct this habit are:

- the swimmer kicks along beside the wall with the incorrectly kicking foot beside the wall. As the swimmer kicks, they place the foot on the wall and push themselves along. This encourages the foot to turn out in order that the toes can make contact with the wall. One hand may have to hold the wall in order to stay close to the side
- Breaststroke kick done on the back (like a Survival Backstroke kick) with a kickboard extended down over the knees and the stomach pushed up in the gap between the arms. The kickboard physically assists in pushing the knees outwards. This drill is also useful if the knees are drawn up under the chest when kicking on the front. It is not easy on the back for the knees be lifted out of the water. If the kickboard is turned so that it is held sideways, a physical barrier is also put in place to stop the knees lifting. Teachers should encourage swimmers to keep the hips close to the surface of the water and knees under
- to swim with the head turned around to the same side as the incorrect foot. When a knee turns in, the foot points and one hip drops. Lifting the dropped hip up by turning the head around to the side, raises the knee up and out and forces the foot to turn out. Once the habit is broken, gradually turn the head back to a forward position

Long arm pull

A long arm pull down to the hips each stroke usually develops due to the arms trying to compensate for a weak kick. Overcorrection by swimming with a small stroke/scull gradually increasing in size until the desired arm stroke pattern is achieved combined with strengthening and improvement of the kick.

Up and down bobbing

This is a result of any incorrect timing of the kick, arms and breathing. Usually also evident is a long arm stroke. The recovery of the stroke underwater coincides with the legs being drawn up to the buttocks. The two actions in combination cause a "dead spot", stopping forward movement in the water and forcing the body to drop.

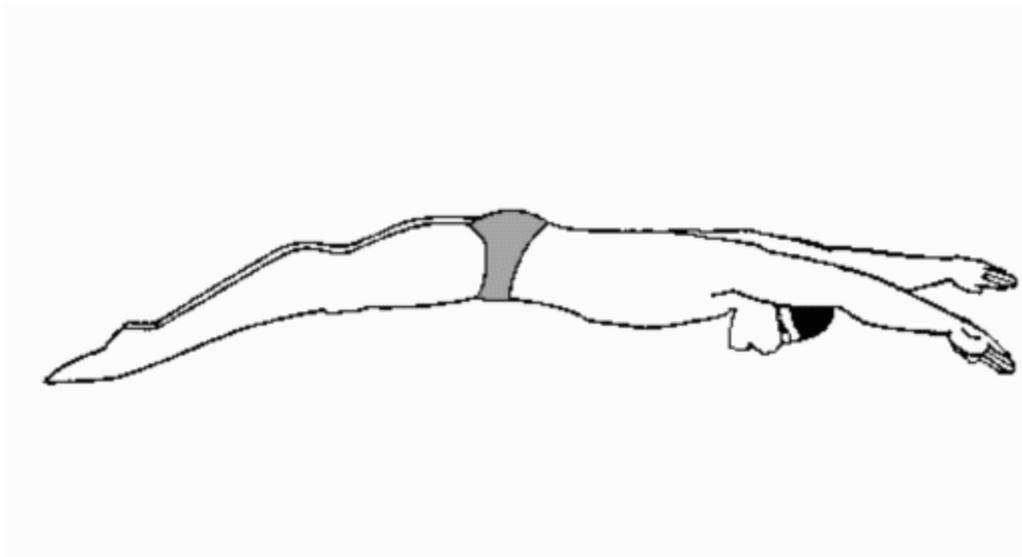
Butterfly

Butterfly originated from Breaststroke. Between 1933 and the early 1960's, the arms in Breaststroke were recovered over the water by some swimmers searching to reduce the resistance on the recovery.

This became another stroke called Butterfly in order to preserve the integrity of the ancient Breaststroke style.

Until 2002, the stroke could be swum with a Breaststroke kick but this is no longer allowed under the rules for elite competition though still permissible under masters swimming rules.

Simplified Butterfly Rules



Butterfly is basically the "three together".

The arms must go down through the water and around over the water together, the feet must go up and down together (or in masters swimming they may go around together – Breaststroke kick) and the hands must touch the wall together. The shoulders must also be kept level with the surface of the water.

It is permissible to Butterfly kick with one leg higher than the other is or legs apart, so long as both go up at the same time and down at the same time.

Ideal Butterfly

In its simplest form, Butterfly can be described as "double arm Freestyle". It is an unforgiving stroke that requires the swimmer to swim technically correct or it becomes exponentially harder.

For beginners it can be likened to cracking a whip. The handle (head, arms and shoulders) is moved and the result is that the tail moves (hips, knees and feet). In a swimmer, this transfer of movement from top to toe will occur if the water is supporting the swimmers body and the swimmer is relaxed. This can only be achieved with correct body position, which essentially means the head must be positioned correctly. Note there is a large degree of neck flexation throughout the stroke cycle.

This movement of the head combined with the rise and fall of the shoulders causes the rest of the body to "dolphin" or bend in the middle and the legs to flick up and down. This bending transfers energy from the upper body through to the legs and puts more drive into the kick as well as assisting in getting the head clear of the water for a breath by causing the shoulders to rise as the head rises.

The pathway for the hands and arms is similar to a chin up over the edge of the pool. Imagine standing in the water with your hands on the pool edge. You are going to lift yourself up out of the water over the edge. You start out with you arms straight and gradually bring your body closer to the wall, bending your elbows up to about 110 degrees when the hands are in front of the chest. Once the hands

are past the chest, the arms gradually straighten again until they reach your legs.

The Butterfly underwater stroke is similar, excepting that there can be some sideway sculling movement of the arms as they move backwards.

The arm stroke is characterized by a sudden change in direction as the hands enter the water. This can, at times appear as though the hands have paused after the entry. The hands then follow a keyhole pathway gradually accelerating in speed.

Once the arms are past their maximum elbow bend, (usually when the hands are in front of the chest) the arms rapidly accelerate down towards the legs, with the momentum of the push back, in combination with the shoulders rising, causing the arms to recover with a full wide stroke out to the side.

Once the hip/knee/leg/feet movement is evidenced and the pattern developed, the Teacher can then encourage the learner to "kick" and move the legs to aid propulsion. The emphasis in the kick is on the downward action with the legs and knees relaxing on the upward.

This whole body action enables the shoulders and head to raise as the hands approach the legs, so that the breath is taken as the hands pass the legs. The head and shoulders stay up to aid in the recovery of the arms. Once the arms are past the shoulders on the recovery over the water the neck bends, dropping the head and shoulders down rapidly, whilst the arms continue around to stretch out in front.

By the time Butterfly is taught, the learner will have a diverse range of aquatic skills developed through their acquisition of Freestyle and Backstroke. This enables the Teacher to potentially take bigger progressions in their teaching drills, still with the underlying thought that a learner must show they have "learned" the skill at each step of the way.

Butterfly Skill Progressions

Because it is a whole body action when Butterfly is swum, it is best to use the whole body when "kicking" though the word "wiggling" is often also used to impress the whole body action.

- with the arms by the side, float on the front. Stay relaxed and quickly move the head, shoulders and butt up and down about 30 centimetres (bending and straightening in the middle - like bowing), allowing the legs, knees and feet to bend and respond as they like.
- as with 1. and now keeping the hands extended in front to control the depth, add fins and wiggle. Try this on the surface as well as 0.5 metre under water for about 10 kicks.
- lie on the side with the lower arm extended and the other arm by the side, dolphin kick using a whole body action. This promotes a leg drive in both the up and down action of the kick.
- advanced Butterfly swimmers can also try a dolphin kick action to tread water either with the hands assisting by sculling or with the hands clear of the water. This improves efficiencies in the kick and strengthens the legs. First attempts may be of only a short duration.

Arms: Whilst it is important to learn the correct arm/hand pathway, learning the change in speed of the hand as it moves through the water is equally important.

- with the arms extended, glide on the front. Bring the arms down together slowly to the side, then around over the water to the front as fast as you can.
- as in drill 1. and with a keyhole pull and the increase in hand speed occurring once the hand passes the chest.
- as in drill 2. and as the hands pass the chest, arch the back, raise the shoulders and increase the arm speed.
- as in drill three, and allowing the hips, knees and feet to relax so that they move as the shoulders rise and fall.

Breathing and timing: As the hands begin their inward sweep out in front, the neck begins to extend and the head rises so that as the hands approach the legs, the head and mouth is clear of the water

and a breath taken. It is important the head stay up so that the shoulders assist the arms out of the water until the arms are half way through the recovery. At this point, the neck can bend the head downwards again and the shoulders can drop.

- One arm Butterfly. To get the arms out of the water the shoulders must lift up. One drill which can assist the learner achieve this is to swim with one arm. Teachers can suggest different patterns of this such as 3 strokes change. Three strokes are done with the left arm, whilst the other arm remains extended out in front. Then swap and do three strokes with the right arm, then follow this with three strokes with both arms. Repeat the cycle of 3 left, 3 right, 3 both arms until the swimmer gets to the end point. Breathing should still be to the front or slightly to the stroking side. The swimmer can raise one arm easier than two arms. By doing each side correctly, the swimmer is more likely to carry this pattern through to both arms interspersed in the drill.
- Breathing rotations. Often the head does not drop quickly enough for the body to re-attain a buoyant equilibrium before the next stroke cycle. By breathing less frequently, the swimmer can better judge the ideal body position. Breath 1 stroke, then after 2 strokes and then after 3 strokes and so on up to 6 strokes without a breath (ascending set) then work the way back down (descending set) breathing after 6, then 5 then 4 and so on to 1. This allows time for the head to get back down and the legs to rise into correct position.

Butterfly Faults and Corrections

If the Teacher emphasises the lifting of the hands out of the water and the learner follows this instruction, the result can be the arms going up into the air, and the shoulders being forced downwards. This is opposite to what should be happening and appears at times as if the learner is doing about 3 wiggles per arm stroke. The emphasis should be on lifting the shoulders and bringing the arms wide around out to the side. One arm alternating drills will assist in raising the shoulders instead of lowering them.

Another fault often seen is "limping" where one arm is up out of the water and the other recovers through the water or alternately one hand arrives at the front before the other causing an unbalanced appearance. This is a consequence of the arms not exiting the water correctly. The arms should have a full wide recovery, leading with the back of the hands, thumbs turned down. If instead, as the hands pass the legs the swimmer twists the hands to reach thumbs and fingers first. This will cause the elbow to drop and "snag" or catch on the water slowing the recovery velocity. The result is that this arm is more difficult to recover, recovers slower and thus takes longer to get to the entry point or if a beginner, the swimmer takes the easy alternate and may recover the arm through the water. Alternating stroking as in one arm Butterfly will assist, with emphasis on the hand pitch (thumbs down) and width of recovery with shoulders up. An overcorrection drill would also be to get the swimmer to swim with the head turned slightly to the "weaker side" encouraging the shoulders to even up, thus creating a scenario where the arms will recover over the water. Over-practise of this drill can lead to a dropped shoulder the other side.

If the neck does not flex to enable the head to rise and fall, the result will be that the swimmer will swim up for a breath and then collapse down into the water. This swim up, fall down style is not efficient as the momentum of forward movement is lost. By bending the neck, to drop the head into the water after a breath, the hips are raised. This up and down movement of the hips transfers to the legs, forcing an up and down movement of the feet – a partial kick, supplemented by the action of the swimmer.

Medleys, Competitive Starts and Turns

These items are taught within swimming squads and are covered in the ascta Swim Australia TM Teacher of Competitive Swimming (SAT CS).