

2.6 Butterfly

At the end of this section you should have a clear understanding of:-

What to teach in butterfly:-

- The technique of the butterfly stroke.
- The common faults in the butterfly stroke.
- The corrections for the main faults in butterfly stroke.

How to teach the butterfly stroke:-

- The technique of the butterfly stroke to inform explanations and demonstrations of the butterfly stroke.
- Suitable activities to introduce and develop the butterfly stroke related to pupil ability.
- The sequencing of practices to introduce and develop the butterfly stroke.

Historic Development

Butterfly is the newest of the strokes and as such has a short history of development.

Butterfly started to evolve in the 1920's as an over arm version of breaststroke due to the fact that the breaststroke law at that time did not stipulate an underwater arm recovery. The over arm recovery gave a faster stroke due to less resistance and this developed until in 1952 all Olympic breaststroke finalists used the over arm butterfly breaststroke.

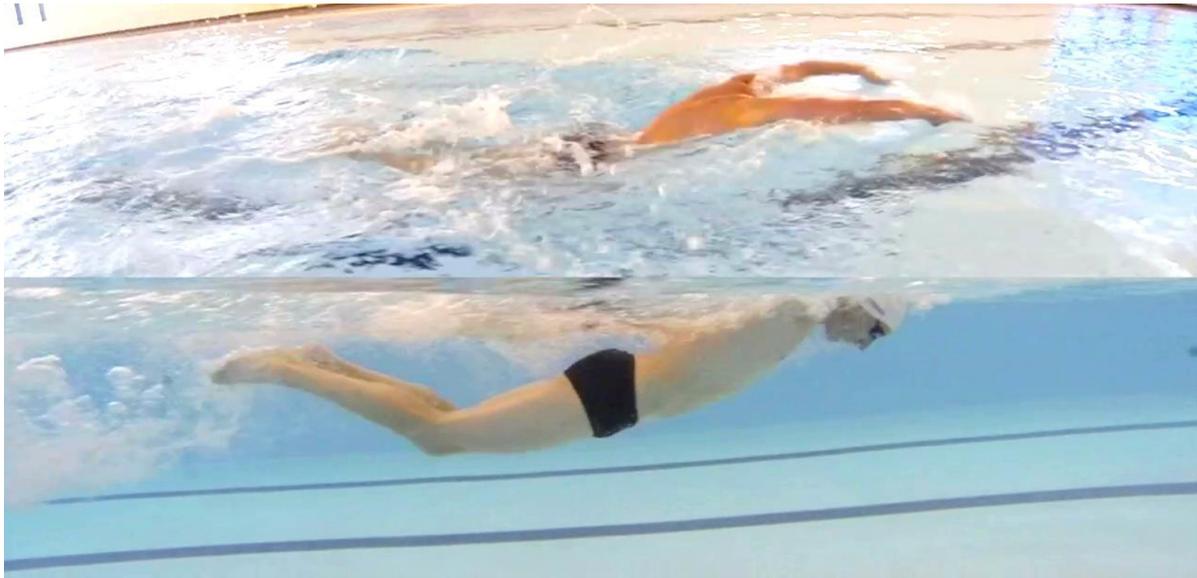
Following the 1952 Olympic Games the two strokes were separated and butterfly began to develop in its own right.

The butterfly stroke was initially swum with a breaststroke leg kick but the sideways spread of the legs caused unnecessary resistance and the leg kick quickly evolved into the dolphin kick, which caused less resistance and was easier to time with the arms.

2.6.1 Stroke Technique

Body Position

As with the other strokes the prone body position should be as **horizontal and streamlined** as possible. However, the nature of the butterfly stroke, with its forward breathing which causes the hips to lower and strong double down beat of the legs which causes the hips to rise, is such that **undulation** occurs. This undulating movement should not be over exaggerated.



The undulation results from the movements of the stroke that have up and down elements to them e.g., the downbeat of the legs forcing the hips up, the raising of the head forwards to breathe causes the legs to drop, the first part of the arm pull causes some downward pressure which causes the upper body to rise, the weight of both arms out of the water at the same time has a sinking effect etc. Although the upward and downward stroke movements contribute to undulation, excessive undulation involves travelling upwards and downward rather than forwards and therefore should be avoided.



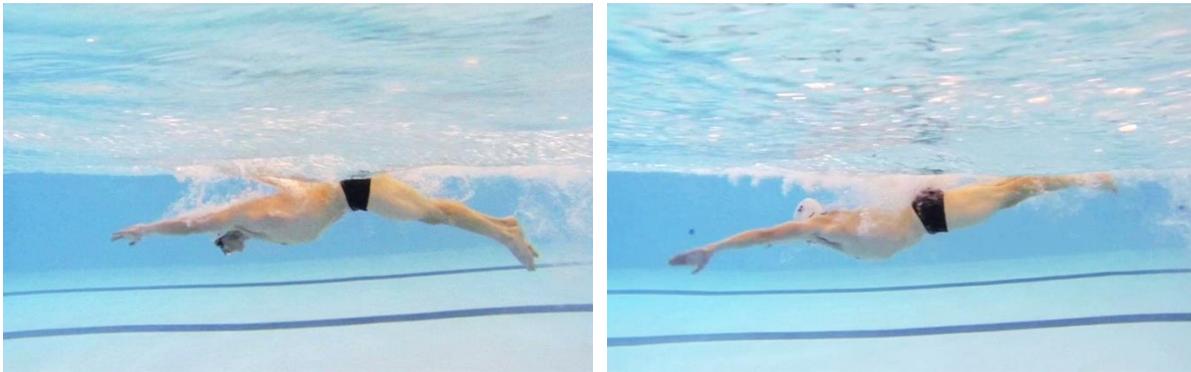
The shoulders should be parallel to the surface of the water.



Leg Action

The leg kick is an upward / downward movement performed with the legs together. It is simultaneous, continuous and undulating. It can be broken down into an upbeat and a downbeat.

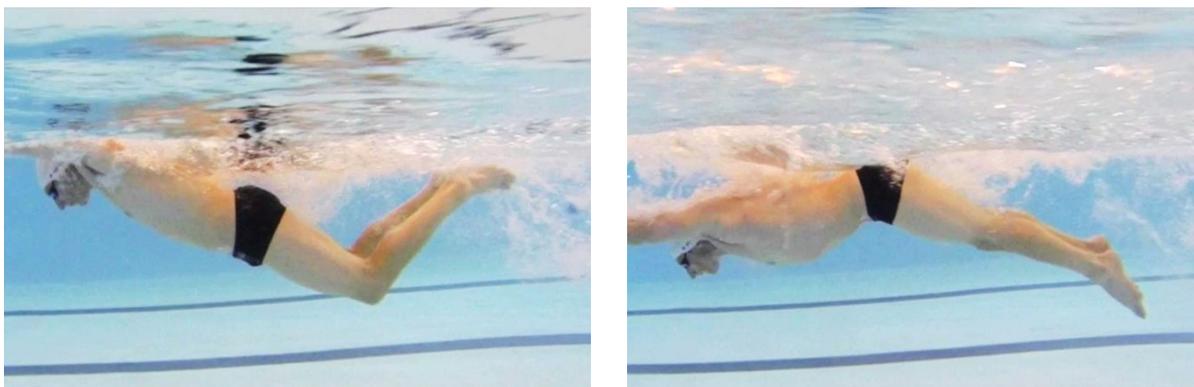
The **upbeat** is performed mainly with the legs straight. It is initiated from the hips and performed with the feet planter flexed (pointed toe position). As the feet approach the surface the knees start to bend bringing the feet closer to the surface and ready to commence the downbeat. The bend of the knees both lowers the knees and raises the toes further to reach the surface.



The **downbeat** continues with the vigorous extension of the knees to straighten the leg. As the lower leg beats down the ankle is in extreme planter flexion. As the lower leg beats down the hips are driven up towards the surface helping to flatten the body position.

The two legs kicks most commonly used in the stroke, usually take place: -

- as the hands move from entry to catch.
- as the hand are sweeping through past the thigh (upsweep).



Kick 1 – as hands are moving from entry to catch.



Kick 2 – as the hands sweep up past the thigh

Arm Action

The arm action is the main source of propulsion in the stroke and is simultaneous and continuous. It can be broken into the entry, propulsive phase and recovery phase.

The Entry and 'catch'.

The hands enter the water at approximately shoulder width. As the arms enter they are not fully extended. The thumb/ first fingers enter first with the palms of the hands turned outward at about 35°, as this avoids pulling air bubbles under the surface. The hands stretch forward under the water and scull outwards towards the **catch**.



The Propulsive Phase

The **outsweep** starts as the hands press down and out from the **catch**. The elbows are kept high and the arms rotate and the wrists flex to face the hand down and back from the catch position. The elbows start to bend as the arms sweep out at the start of the 'keyhole' shaped pull. The arms are at the widest part of the 'keyhole' while in front of the shoulder after which the hands begin to sweep **downwards and inwards** to the narrowest part of the 'keyhole' which occurs under the chest area.



Catch and Outstroke

As the arms complete the insweep the elbows are at their maximum bend of approximately 90° as the hands come towards each other with the thumbs uppermost. The hands accelerate as they go through the sweeps.



Downstroke and Insweep

From this point the hands continue to accelerate into the **second outstroke** with the hands turned to face out and back. The arms extend as the hands sweep through past the thighs. The long vigorous sweep through to the thighs is important to carry the arms out of the water and into the recovery phase. The hands turn to face the palms inwards as they pass the thighs in order to facilitate the lifting of the hands out in the recovery phase.

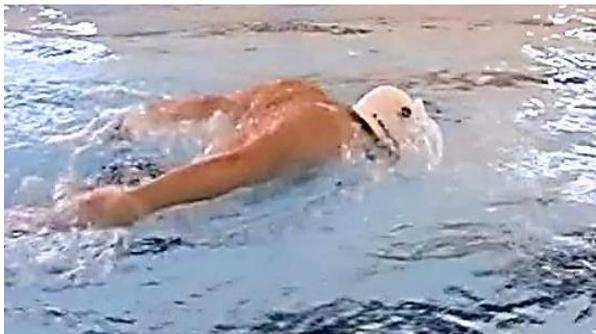


Recovery Phase

The elbow leads the lift of the arms out of the water into the recovery phase. They are swung sideways to recover low and flat over the surface of the water with the arm almost straight.



The arm should be relaxed and should rotate medially as it swings forward so that the hand is positioned with the thumb down for the entry in front of the shoulder line. Lack of shoulder mobility can be a problem in butterfly as it limits the double arm recovery, often making the movement rather slow and causing a wider entry position. Having the head down low in the water / down quickly after breathing can help to minimize this problem.



Breathing

The head is raised forwards to breathe as the arms are sweeping back towards the thighs. The head is raised to the level where the chin is resting on the water surface.

The breath is inhaled as the arms finish the second outswEEP and are moving into the recovery phase. The head is dropped back into the water before the hands are forward for the entry.

Due to the vigorous nature of the stroke, explosive breathing is more common, with the breath being exhaled during the middle and final phase of the arm pull as the head is being raised.



Due to the fact that the forward breathing position disturbs the body position it is usual to breathe only every two strokes to minimise the disturbance.



Timing

There are two kicks of the legs to each cycle of the arms. The kicks occur, one at the start of the arm pull when the hands are at the 'catch' position and the second during the second outswEEP of the arm propulsion. The second kick is particularly important in driving the hips up at a moment when the final part of the arm sweep is taking place in order to

capitalise on the maximum propulsion. The lift of the arms into the recovery has a tendency to cause the hips to sink (as the arms sweep back and out of the water into the recovery).

Question 1

a) Describe the butterfly stroke by selecting the correct words from the pairs offered. Delete the words that do not apply.

- simultaneous / alternating
- prone / supine
- flat / undulating

b) Describe the butterfly leg kick under the following headings.

Upbeat _____

Downbeat _____

c) Describe the propulsive phase of the arm action in the butterfly

d) Explain the timing of the breathing with the arm action and of the arm action with the kick in the butterfly.

Timing of breathing and arm action _____

Timing of arm action and leg kick _____

2.6.2 Practices for Teaching the Stroke

The series of practices listed cover all levels of ability from the beginner to the competitive swimmer, all of whom need to learn or practice technique and co-ordination, strengthen aspects of their stroke, etc. Practices must be selected to suit the ability of the child/group and relate to the aim of the lesson. Use of a more extensive range of practices adds interest to sessions.

The vigorous nature of butterfly must be understood and it is an advantage if swimmers have reasonable ability in the front crawl prior to starting butterfly.

The following categorisation of ability levels is to serve as a guide to teachers in the selection of practices in the early stages of teaching. Basically only a little full stroke can be swum by the majority of swimmers but careful selection of 'part' practices can give pupils experience of the elements of the stroke while at the same time improving their ability in attaining success in the full stroke.

Beginners/Early Improvers_(at Butterfly Stroke)

Basic body position practices, e.g., push and glide and leg kick practices and practice encouraging the body movement of the stroke.

Basic arm technique should only be done as part of the whole stroke very briefly, and mainly as 'single arm' butterfly due to the exhausting nature of the stroke in the early stages.

Intermediate Stage

Body position and leg kick practices. Arm technique practices, again mainly single arm butterfly and a little as part of the whole stroke.

The Able Swimmer/Very Able Swimmer

Stroke drills for arms and legs to improve technique. Practice of starts and turns associated with the stroke. Stroke/arm/leg practices over increasing distance.

Practices are listed with some brief comments indicating their main use, important points in execution of the drill, etc. Teaching points should be selected from your knowledge of stroke technique.

Practices 1 - 11 focus on leg action, practices 12 - 22 relate to arm action, practices 23 - 26 relate to breathing and practices 27 - 29 relate to the timing of the full stroke.

Leg Kick Practices

PRACTICE (what to do)	USE (when / why to do it)	COMMENTS (teaching points)
1. Leg kick on the front without a float, arms extended, body at the water surface.	Streamlined position and leg action.	Toes pointed, legs together. Undulating body reaction. Drive down of the legs raises hips.

2. As (1) underwater.	Streamlined position, leg action.	As above.
3. As (1) but with the arms at the sides ('Man from Atlantis' for those that can remember that long ago!). Can then be done underwater as (2).	Leg action and body movement. Feel of kicking action.	Swimmers must 'watch' for the side of the pool to avoid collision of the head on the wall. Many find it easier to get body movement with arms at the side of the body initially. Technique as above.
4. Kicking lying on the side at the surface. One arm extended and one at the side.	Variation. Feel of kicking action.	Lower arm is extended, upper arm at the side. Technique points as in 1. Can be done with a small float held against the chest but is better without.
5. Kicking lying on the side underwater. One arm extended and one at the side.	As above.	As above.
6. Kicking lying on the side at the surface. Arms at the side.	As above.	Both arms at the sides. Due to the shorter lever many pupils find the arms at the side position easier.
7. Kicking lying on the side underwater. Arms at the side.	As above.	As above.
8. Kicking on the back, arms at the sides, at the surface.	As above.	Encouraging the 'flip' of the toes up to break the surface can help get vigorous extension of legs. Can be done with a small float held against the chest and then without a float.
9. Kicking on the back, arms at the sides, underwater.	As above.	As above.
10. Kicking with fins using practices 1 - 9	Strengthening of leg kick. Can help get foot position / leg kick / propulsion in weaker swimmer initially.	Supervise the fitting of fins. Limit time spent with fins initially to avoid stress. Technique points as in 1.
11. 'Porpoises' in shallow water.	Undulating nature of the stroke.	A 'fun' introductory stage. Springing up from the pool floor / up and over the surface / dive back in to glide under the water.

Arm Practices

PRACTICE (what to do)	USE (when / why to do it)	COMMENTS (teaching points)
12. Standing in shallow water leaning forward so	Arm action technique.	Check body and head position. Head low makes the arm

that face/trunk are in the water, practice of arm action.		recovery action easier. Can work on the basic pull / throw action or on specific points such as entry position / pulling pathway / exit and arm recovery.
13. As (12) walking across the shallow end.	Arm technique	As above.
14. Walking butterfly arm action for half width, push off swim the rest.	As above.	Try to do swimming part, breath-holding.
15. Single arm fly with other arm held extended in front.	Allows swimmer to perform the elements of the stroke, e.g., kick, arm technique, breathing, etc., without being as stressful/tiring as full stroke.	For early stages of learning single arm should be used instead of full stroke except for 1 or 2 widths.
16. Single arm fly with other arm at the side.	More demanding than (15) as the front of the body has less support but allows basics of the stroke to be emphasised.	As above and for the more able to enable them to do more distance on fly than they could possibly do full stroke.
17. Variations of single arm and full stroke, e.g. 3 right arm, 3 left arm, 3 full stroke.	For more able swimmers. As with 15 and 16 plus co-ordination of limbs/stroke.	Many other variations are possible 3R, 3L, 1 full stroke, etc.
18. Dive Fly. Arm recovery, 'dive' to submerge, kick underwater, pull to surface (repeat).	Full stroke less demanding of arm power due to longer kicking spell.	Stress underwater kicking.
19. Arms only with float/pull buoy.	Arm strengthening. For able swimmers only.	
20. Arms only, single arm or full stroke with paddles.	Only for very able swimmers. Arm strengthening.	Introduce gradually. Excessive distance will cause shoulder strain. Again mostly done with single arm.
21. Full stroke over short distances concentrating on points of technique.	Arm technique.	Points of technique related to ability stage.
22. Full stroke with fins.	Feel of stroke. Gives ability to do full stroke with greater ease earlier.	Supervise fitting of fins to avoid damage. Do not use excessively.

Breathing Practices

PRACTICE (what to do)	USE (when / why to do it)	COMMENTS (teaching points)
23. Standing in shallow water leaning forward so that face/trunk are in the	Timing and movement of breathing.	Check realistic body position with trunk horizontal. Check that head is only lifted till

water, practice of arm action with breathing.		the chin is at the surface.
24. As (23) walking across the shallow end.	Breathing technique, timing and movement of the head.	As above.
25. Single arm fly with other arm held extended in front. Breathing to the front as in full stroke.	Concentrating on breathing, timing with arm action and lifting head only till the chin is at the surface	Single arm is less stressful and should be used instead of full stroke except for 1 or 2 widths.
26. Full stroke over short distances concentrating on points of technique.	Breathing technique.	Limited number of single widths initially.

Timing Practices

PRACTICE (what to do)	USE (when / why to do it)	COMMENTS (teaching points)
27. Single arm fly with other arm held extended in front.	Allows swimmer to perform all the elements of the stroke, and work on the timing in a less stressful situation	For early stages of learning single arm should be used instead of full stroke except for 1 or 2 widths.
28. Variations of single arm and full stroke, e.g., 3 right arm, 3 left arm, 3 full stroke.	For more able swimmers to develop timing.	Many other variations are possible 3R, 3L, 1 full stroke, etc.
29. Full stroke over short distances concentrating on points of technique.	Concentration on timing.	Limited number of single widths initially.

Summary of main points of technique for basic teaching of the stroke of Elementary/Improvers level

- Body position flat and streamlined but the stroke involves some undulation.
- Up/down leg kick with legs together. Keep legs straight on the upbeat then bend and whip down to straight on the down beat.
- The hips are driven up as the lower legs drive down.
- Arm entry at shoulder width.
- Keyhole shaped arm pull.
- Arms sweep outwards to 'catch', outwards and downwards, then inwards and then upwards and outwards to the thigh all the time moving strongly backwards with the hand facing predominantly backwards. (keyhole shaped pathway)
- Breathe by lifting head as the hands sweep upwards towards thighs.
- Return the head to the water before the arms finish the recovery phase.
- Breathe every second arm stroke.
- 2 Kicks per arm stroke; one at the 'catch' position and one at the upsweep through to the thigh.

Sequencing of practices

The butterfly stroke is more demanding physically than the other strokes. It is therefore necessary to structure the practices in a way that ensures that pupils are not over-stressed. This involves using a lot more part practices in relation to full stroke practices. Pupils only swim a few single widths of full stroke during a lesson. If this is not the case they will be very tired and will be swimming badly. This simply reinforces poor technique and makes them de-motivated due to excess tiredness.

Butterfly 'full stroke' is very tiring for learners

..... main emphasis is on part practices

..... only very short distances of 'full stroke' for learners

Due to the undulation within the stroke care has to be taken that practices do not put unnecessary stress on the lower back. Thus kicking is not done with a float held out in front as is normal in the other prone strokes. Practices that have the float out in front would be stressful in butterfly as the undulating action would involve the pressing down and submerging of the float at arm's length. As the float is intended to stay at the surface and provide buoyancy pushing it down into the water is both unnecessary effort and stress on the back. In addition, for the early learner, the position with the arms at the side allows for much easier undulation due to the reduction in the length of the top end of the body lever. Progress can then be made to having the arms extended (but without the added buoyancy of a float) which is closer to the streamlined position the body goes through in the stroke at arm entry.

Butterfly can be stressful on the lower back

.... choose practices carefully

With these principles, which are particular to butterfly, in mind the other principles of selecting the fundamental feature of the stroke as the starting point to selecting and structuring practices still apply. In this case the fundamental features are the undulating nature of the stroke and the symmetrical type of double leg kick.

Question 2		
Fault	Reason	Correction practice
Wide arm entry		
Body very angled / head high / hips low		

Pausing after arm entry		
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Question 3

a) Provide a sequence of 4 practices for late primary school pupils who are reasonable swimmers for their first attempt at butterfly.

1. _____

2. _____

3. _____

4. _____

Faults and Corrections for Butterfly

The best way to know how to correct the fault in a swimmer's stroke is to understand how the body moves in water. If you understand how the body moves in water i.e. what happens when you raise your head, what happens if you swing your arms wide etc. you will understand why things happen and will therefore know how to correct them. The following table which provides you with a number of key / frequently found faults in young swimmers / early stage learners, shows the most likely reasons for those faults and provides suggestions of practices that could be used to correct them.

In the first instance spotting the fault and getting it correct (i.e. spotting the primary fault / the most basic of the faults) requires both good observation and adhering to the procedure of looking at the stroke systematically i.e. BLABT. Look at the body position then the leg action then the arm action then the breathing then the timing. Pick the first fault as the most important.

Fault	Cause	Correction
1. Head high and legs / feet low.	Head too high / Lifting head too high to breathe. Not breathing out when the face is in the water / poor breathing technique.	Breathing practices to establish exhalation in the water.
2. Too much undulation.	No outswEEP after the entry. Intending to undulate / poor understanding of the stroke.	Reverse lobster scull. Arm and breathing practices with emphasis on minimising

		the up / down movements. E.g. head only rising to chin at the surface / head back in before the arm recovery finishes.
3. Arms not clearing the water in the recovery.	Failure to complete the upsweep vigorously.	Single arm with emphasis on the upsweep.
4. Arms pausing after entry in a glide.	Poor timing of the 2 leg kicks. Lack of strength / tiredness.	Single arm working on timing of the 2 kicks. Limiting the amount of full stroke.
5. Arms entering wide of the shoulder.	Head up for too long, head not back in the water before the hand entry. Poor shoulder mobility.	Work on breathing technique, exhaling into water / head back in before arm recovery finishes.
6. Head too high for breathing.	Poor breathing technique / not breathing out into water. Lifting head rather than pushing chin forward. Goes with excess undulation, too much up / down movement.	Breathing practices with emphasis on minimising the up / down movements. E.g. head only rising to chin at the surface / exhaling into the water / head back in before the arm recovery finishes.
7. Legs bending too much / feet coming out of the water.	Kicking from the knees.	Kicking practices on front, back and side. Kicking with fins.