

# NDC **EXTRA** e-bulletin



The bulletin from the National Diving Committee of the British Sub-Aqua Club

## BSAC Basic Life Support Guidelines 2006

### General Points

The following guidance has been prepared by the Safety and Rescue Skills Advisor and endorsed by the National Diving Committee to update our guidance and procedures in light of current advice and guidance available from all relevant sources. Key changes are highlighted in boxes within the text below for ease of reference.

### Background to changes

The techniques for life support and resuscitation taught by the BSAC currently are based on an international collaboration between experts in resuscitation medicine from the world's major resuscitation organisations and are therefore consistent not only with other agencies providing training to lay rescuers, but also with the techniques used by doctors, nurses and others working in medical services around the world. These techniques are all based on the best evidence as to what is most effective.

As knowledge advances a regular review of this evidence is needed and such a review took place in 2005 leading to the publication of the 2005 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (CoSTR, Ref 1). This formed the scientific basis for the European Resuscitation Council (ERC) Guidelines for Resuscitation (2005) (Ref 2) and the Resuscitation Council (UK) Guidelines 2005 (Ref 3).

The BSAC has considered the revised guidelines and this document represents the BSAC recommended technique for basic life support. The training materials for the Diver Training Programme and Skill Development Courses will be revised to incorporate these changes. It will take time for courses and training materials to be updated and for changes in practice to be disseminated. During this period there will be some variation in practice between individuals. There is no evidence that the "old" techniques based on guidance published in 2000, were dangerous or ineffective, however this new

approach is recommended and is based on the best available evidence as to what is most effective. Changes in practice such as this emphasise the importance of always keeping these rescue skills current and in practice by regular up-to-date training.

### Changes to BSAC Guidance and Training

#### Terminology

The revision of the Resuscitation Guidance for the BSAC is an opportunity to bring nomenclature in line with that used by other rescue agencies and resuscitation training agencies.

The term "Resuscitation" refers to a wide variety of techniques to promote recovery in casualties who have suffered cardiac and/or respiratory arrest. These techniques encompass some which are appropriate for lay rescuers with minimal and often no equipment, through rescuers with progressively more training and facilities, to those methods only available in hospitals.

The technique first introduced in the Diver Training Programme at ST2 and referred to as "Resuscitation" should be referred to as "Basic Life Support".

#### The rationale for this is:

- This is consistent with other training agencies which use this term for this technique which requires no equipment
- The term "Basic Life Support" emphasises the purpose of the technique (ie to maintain the viability of the casualty)
- It reduces the expectation that this technique alone will promote full recovery
- It therefore emphasises the need to obtain help urgently
- It will potentially reduce the likelihood of self-recrimination in the rescuer in the event of an unsuccessful rescue attempt
- It is consistent with the principle of progressive

training with the introduction of pocket mask, oxygen enrichment and airway adjuncts later in training in the rescue SDCs

The technique generally referred to as "Artificial Ventilation" ("AV") throughout the DTP and SDCs should be renamed "Rescue Breathing".

- This again promotes consistency across agencies
- It also emphasises a distinction between other types of artificial ventilation taught currently in the Rescue First Aid SDC

Thus "Basic Life Support" encompasses rescue breathing and cardiac compressions only.

### Guideline change

The main aim of the guidance change has been to reduce the possibility that cardiac compressions are interrupted during basic life support. It has been recognised that such interruptions are common and are associated with reduced chances of survival for the casualty.

#### The major changes are

- 1) Cardiac arrest is diagnosed if a casualty is unresponsive and not breathing normally.
- 2) Rescuers should place their hands in the centre of the chest, rather than spend more time positioning their hands using other methods.
- 3) Each rescue breath is given over 1 sec rather than 2 sec.
- 4) Use a ratio of compressions to Rescue Breaths of 30:2 for all casualties.
- 5) Once the casualty is on land, on diagnosing cardiac arrest,
  - summon help, leaving the casualty if necessary
  - give 30 compressions immediately
  - if circulation is not then apparent follow this by 2 rescue breaths
  - give 30 compressions followed by 2 rescue breaths
  - continue compressions and ventilation at 30:2 ratio.

### Basic Life Support Sequence

In diving situations it is very unlikely that a lone rescuer will initiate these actions on land or in a boat. The most likely scenario is that Life support attempts will have been initiated in the water by a lone rescuer, and once the casualty is out of the water other members of the diving group will be available for help. Once the casualty is on land or in a boat the following sequence should be followed.

**1 Make sure you, the casualty and any other divers or bystanders are safe.**

**2 Check the casualty for a response**

- gently shake his shoulders and ask loudly: "Are you all right?"

**3a If he responds**

- leave him in the position in which you found him provided there is no further danger
- try to find out what is wrong with him and get help if needed
- reassess him regularly

**3b If he does not respond**

- shout for help
- turn the casualty onto his back and then open the airway by placing your hand on his forehead and gently tilting his head back, keeping your thumb and index finger free to close his nose if rescue breathing is required
- with your fingertips under the point of the casualty's chin, lift the chin to open the airway

**4 Keeping the airway open, look, listen and feel for normal breathing**

- Look for chest movement.
- Listen at the casualty's mouth for breath sounds.
- Feel for air on your cheek.
- In the first few minutes after cardiac arrest, a casualty may be barely breathing, or taking infrequent, noisy gasps. Do not confuse this with normal breathing. Look, listen, and feel for no more than 10 seconds to determine whether the casualty is breathing normally. If you have any doubt whether breathing is normal, act as if it is not normal.

**5a If he is breathing normally**

- turn him into the recovery position
- send or go for help/call for an ambulance
- check for continued breathing

**5b If he is not breathing normally**

- send someone for help or, if you are on your own, leave the casualty and do this yourself; return and start chest compression as follows:
  - kneel by the side of the casualty

- place the heel of one hand in the centre of the casualty's chest
- place the heel of your other hand on top of the first hand
- interlock the fingers of your hands and ensure that pressure is not applied over the casualty's ribs. Do not apply any pressure over the upper abdomen or the bottom end of the bony sternum (breastbone)
- position yourself vertically above the casualty's chest and, with your arms straight, press down on the sternum 4-5 cm
- after each compression, release all the pressure on the chest without losing contact between your hands and the sternum
- repeat at a rate of about 100/min (a little less than 2 compressions per second)
- compression and release should take equal amounts of time

## 6 Combine chest compression with rescue breaths.

- After 30 compressions open the airway again using head tilt and chin lift
- Pinch the soft part of the nose closed, using the index finger and thumb of your hand on the forehead.
- Allow the mouth to open, but maintain chin lift.
- Take a normal breath and place your lips around his the mouth, making sure that you have a good seal.
- Blow steadily into the mouth while watching for the chest to rise, taking about 1 second as in normal breathing; this is an effective rescue breath.
- Maintaining head tilt and chin lift, take your mouth away from the casualty and watch for the chest to fall as air passes out
- Take another normal breath and blow into the casualty's mouth once more, to achieve a total of two effective rescue breaths. Then return your hands without delay to the correct position on the sternum and give a further 30 chest compressions.
- Continue with chest compressions and rescue breaths in a ratio of 30:2.
- Stop to recheck the casualty only if he starts breathing normally; otherwise do not interrupt resuscitation.

If your initial rescue breath does not make the chest rise as in normal breathing, then before your

next attempt:

- check the casualty's mouth and remove any obstruction
- recheck that there is adequate head tilt and chin lift
- do not attempt more than two breaths each time before returning to chest compressions

**If there is more than one rescuer present, another should take over CPR every 1-2 min to prevent fatigue. Ensure the minimum of delay during the changeover of rescuers.**

### In-Water Life Support

- The rescuers should be aware of their personal safety and minimise danger to themselves and the casualty at all times.
- The casualty must be **removed from the water by the fastest and safest means possible.**
- The rescuer must make a firm hold on the casualty and maintain this throughout the rescue.
- The rescuer should make the casualty and themselves buoyant at the surface.
- Open the casualty's airway by applying gentle neck extension
- If there is no spontaneous breathing on opening the airway in this way give rescue breaths for approximately 1 minute (10 Rescue Breaths) (**See 1 Minute Rescue Breath Sequence Note below**)
- If no spontaneous breathing returns, tow casualty while giving rescue breathing at 2 breaths/15 seconds

When in standing depth, or at boat prior to landing, continue rescue breathing for 1 further minute (10 Rescue Breaths), then dekit and land as quickly as possible **WITHOUT** further rescue breathing (**See 1 Minute Rescue Breath Sequence Note below**)

- Begin basic life support according to the above algorithm i.e. 30 cardiac compressions initially, then two rescue breaths

### 1 Minute Rescue Breath Sequence

The rationale for this is that the general algorithm is aimed at the majority of cases of sudden cardiac arrest which are due to ventricular fibrillation, when oxygen stores in the body are not reduced. When asphyxia has occurred prior to arrest oxygen stores are likely to have been depleted. A specific case is made in the 2005 guideline for drowning because this is the only readily identifiable cause of asphyxia.

In diving situations where drowning is the likely cause, and early rescue breathing may be of benefit, this is most likely to have been initiated in the water.

## References

1. International Liaison Committee on Resuscitation. 2005 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. Resuscitation 2005; 67: 157 - 341.
2. European Resuscitation Council. European Resuscitation Council Guidelines for Resuscitation 2005. Resuscitation 2005; 67(Suppl. 1): S1 - S190.
3. Resuscitation Council (UK). Resuscitation Guidelines 2005. ISBN 1-903812-10-0. (available at [www.resus.org.uk](http://www.resus.org.uk))

# BSAC Open Water Instructor Guidance

## Examination Pass Rates and why Student Fail

Since the introduction of the current ITS system in January 2002 the OWI Chief Examiner has been collating statistics on students achievements in each of the 3 Assessment areas and these are recorded in the Table below.

YEAR	CLASS ROOM	THEORY PAPER	PRACTICAL O/W
	Pass Rate	Pass Rate	Pass Rate
2002	89%	94%	84%
2003	87%	92%	87%
2004	91%	95%	83%
2005	88%	94%	83%

From this record and from reading student reports for each component it is clear that there are some fairly obvious factors implicated within each of these components that go some way to explaining why people fail them.

### Theory Paper

The evidence here is that on average there is a 95% pass rate for this part of the examination and this would suggest that there are no major problems in this area.

By far and away the most common reason for people failing this component is due to a reluctance to declare mild forms of reading difficulties. This can be overcome by making the situation clear in advance of the event and this allows a range of simple levels of assistance to be made available. Most people find they simply need an additional 5 or ten minutes of extra time to achieve an acceptable result. Details of the **Guidance Notes for Examining Divers** can be found at

<http://www.bsac.org/techserv/its/examguide.pdf>

## Classroom Assessment

The BSAC Theory Exam is marked on the basis of the four Essential Criteria assessed using the mnemonic **PAVE** covering

### P PROGRESSIVE - Information taught in a logical, progressive manner

Was essential knowledge recapped?

Did the points follow on from each other logically?

Was the new information introduced progressively in small steps?

### A ACCURATE - Information accurate & up to date

Was the information presented accurate?

Was the information presented up to date?

### V VISUAL - Supported by appropriate visual aids

Was each piece of information supported by a visual aid?

Were the visual aids big, simple & colourful?

Were pictures or diagrams used where possible?

### E EFFECTIVE - Contained all essential 'Must Know' information

Did the lesson cover the subject in suitable depth?

Would the lesson have taught the subject?

Most commonly students tend to fall down on two key areas of these criteria

### Effective Teaching

Either by not covering all the relevant 'Must know' information by giving too much of an overview of the topic or by expecting too much assumed knowledge on the part of their assumed audience.

### Accurate Information

The weaknesses here generally relate to a limitation of the knowledge on the part of the would be instructor. It is very much the luck of the draw which subject you are given for this examination but none of the subjects are taken from outside the diver training syllabus beyond Dive Leader level and so should be within the understanding of any Dive Leader which is the prerequisite for this examination.

Overall, however the key factor is in the level of preparation that is dedicated to preparing for this

assessment. On the IFC we make the point clearly that the major part of any successful Presentation is in the Planning and Preparation. To this end we have prepared additional advice and Guidance on the BSAC Website for the TIE at <http://www.bsac.org/techserv/its/tie.htm>

### **Practical Instructor Exam**

It is clear from the data above that the Practical Instructor Exam has the highest failure rate of the three assessment areas that make up the Open Water Instructor Award.

The BSAC Practical Instructor Exam is marked on the basis of the four Essential Criteria assessed using the mnemonic **STEP** covering

#### **S SAFE - for Group and for real students at that stage in their training**

Was the class controlled closely?

Was an appropriate depth used?

Were the entry & exit safe?

Any other safety points in the lesson?

#### **T TECHNICALLY CORRECT & skilful personal demonstrations**

Were the demonstrations clear and performed correctly?

Were the signals clear?

Did all the students see all the demos?

Was the class positioned so they could see?

#### **E EFFECTIVE TEACHING**

Were demonstrations clear and repeated if necessary?

Were significant faults in students' performances identified and corrected?

Was the student able to do the skill by the end of the session?

#### **P PROGRESSIVE - Skill broken down & logical steps**

Were essential skills recapped?

Were new skills introduced in manageable steps?

Were the steps introduced progressively & in a logical manner?

Of these the common elements are less easy to pin down because there is a tendency for them to interact to the extent that where an instructor is poor at the skill itself this will affect both the Technically Correct and Effective Teaching components.

Likewise where lessons are less Progressive then teaching skills in too large a chunk may lead to missing the opportunity to spot significant faults and to correct them.

Once again one of the major problems associated with failure in the Practical Instructor Exam can be attributed to a lack of adequate Planning and Preparation a factor that is stressed throughout the IFC and Open Water Instructor Course. Once again we have prepared additional advice and Guidance on the BSAC Website for the PIE at <http://www.bsac.org/techserv/its/pie.htm>

In addition to this we have identified over the last 4 years that the failure rate on the PIE is much higher for Compass work and lessons that involve In-water AV (now to be termed Rescue Breaths). Compass work is often down to a failure to re-demonstrate following the dry run and once you move to the water but it also relates a general poor level of skill with this piece of equipment. On the other hand the problems associated with AV (Rescue Breaths) lies almost exclusively with a very poor level of skill demonstrated by the instructor or with poor initial technique (such as resting the forearm on the shoulder whilst giving Rescue Breaths). The importance of effective techniques in this key rescue skill is the subject of specific advice offered by the BSAC Rescue Skills Chief Examiner Andy Procter in the following Note.  
*Allan Goodwin, Open Water Instructor Chief Examiner*

# In-water Artificial Ventilation (AV) now Rescue Breaths (RB)

## Clarification of technique

The early initiation of Rescue Breaths (RB) (previously Artificial Ventilation (AV)) is an essential treatment for a drowning casualty. Current guidance for the treatment of drowning recommends that this should be started in-water if the rescuer is trained to do so (1). The BSAC teaches such a technique. This document will

- describe the technique for effective in-water Rescue Breaths (RB)
- incorporate the recently published guidance on this
- recap BSAC guidance as to the rate of in-water AV issued in 2004

## Diving casualties

A non-breathing diving casualty may have suffered many different types of injury to cause the absence of breathing, however because the casualty has suffered these while submerged or immersed in water, drowning must be considered a primary cause or major contributing factor to the casualty's condition and the casualty should be treated for drowning.

## Principles of rescue

The casualty must be removed from the water by the fastest and safest means possible. The rescuers should be aware of their personal safety and minimise danger to themselves and the casualty at all times. Variations in technique may be necessary depending upon the physical build and the equipment of both the casualty and rescuer. Therefore the principles of the technique will be emphasised rather than dogmatically require a standard method.

## In-water Rescue Breaths (RB)

- The rescuers should be aware of their personal safety and minimise danger to themselves and the casualty at all times.
- The casualty must be removed from the water by the fastest and safest means possible.

**1.** The rescuer must make a firm hold on the casualty and maintain this throughout the rescue.

- Suitable hold includes on the top of the casualty's cylinder, or BC strap
- Ideally this hold will allow the rescuer to "roll"

the casualty towards them in the event of Rescue Breaths (RB) being needed

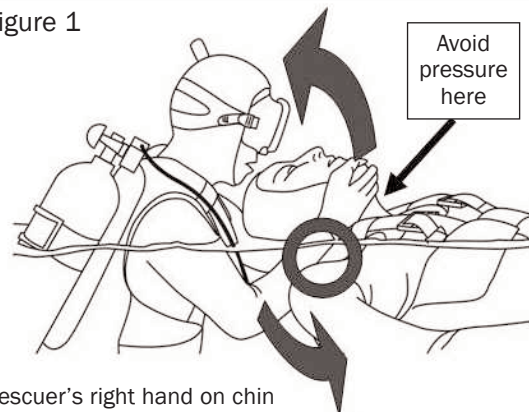
**2.** The rescuer should make the casualty and themselves buoyant at the surface.

- Ensure adequate inflation of buoyancy device to float casualty safely with airway clear of the water in the event of spontaneous breathing returning
- Avoid overinflation preventing adequate neck extension
- Consider the dropping of weight belts/pouches to ensure both maintain position on the surface

**3.** Open the casualty's airway by applying gentle neck extension

- The hand not being used to hold the casualty should be applied to the casualty's chin
- Avoid applying pressure over the centre of the neck (trachea)
- The forearm should be close into the side of the casualties neck (Fig 1) so that the neck can be extended by using the forearm as a "lever"

Figure 1



Rescuer's right hand on chin – avoiding trachea

Forearm tight to casualty's neck

Neck extension achieved by using forearm as lever on casualty's shoulder

- The casualty's head should be tilted backwards as if they started out looking straight ahead and then directly overhead, ie the head should not tilt from side to side
- The purpose of neck extension is to prevent the tongue falling back in the throat. In training, a test of the adequacy of the neck extension is that a student simulating the role of "casualty" will have difficulty swallowing if the neck is extended
- During training divers simulating the role of a casualty should be briefed to relax and rescuers briefed not to forcefully gain the neck extension to avoid the risk of injury.

4. If there is no spontaneous breathing on opening the airway in this way give Rescue Breaths (RB) for approximately 1 minute (10 Rescue Breaths)

- The fingers of the hand applied to the casualty's chin should make an airtight seal over the mouth
- This can be achieved in a number of ways e.g.
  - Direct pressure across the lips
  - Pressing the lips upwards towards the nose
- In training, a test of the adequacy of this seal is that a student simulating the role of "casualty" will have difficulty blowing out through the mouth
- The rescuer should "roll" the casualty towards them whilst still maintaining the position in Fig 1
- The rescuer makes a seal with his mouth over the casualty's nose and applies a rescue breath
- Ventilations should be given at a minimum rate of two breaths every 15 seconds
  - Each breath should take approximately 5 seconds allowing 1 second for inflation and the natural deflation of the chest for approximately 4 seconds
  - Careful monitoring for effectiveness and finding a natural rate is more appropriate than slavish adherence to nominal rates

#### Changes to In-water Rescue Breaths Guidance

In February 2006 the National Diving Committee approved amendments I had proposed to our Basic Life Support Guidance in line with the recommendations of the Resuscitation Council. These changes are summarised in the document 'BSAC Basic Life Support Guidelines 2006' and Instructors, Branch Officers and all divers should make themselves familiar with them. However, one of these changes significantly implicates on the Guidance above and represents a change in our in-water Rescue Breathing (RB) (formerly AV) advice when it comes to dekitting and removal of a casualty from the water. This is summarised in the box opposite.

*Andy Procter, Safety & Rescue Skills Advisor  
February 2006*

#### **1 minute rescue breathing**

(10 Rescue Breaths)

If no spontaneous breathing returns...

Tow with rescue breathing at 2 breaths/ 15 seconds

When in standing depth, or at boat prior to landing...

1 further minute rescue breathing (10 Rescue Breaths)

**Then dekit and land as quickly as possible WITHOUT further rescue breathing**

Begin basic life support according to the 2005 algorithm i.e. 30 cardiac compressions initially then two rescue breaths

#### Reference

- (1) Soar J et al (2005) European Resuscitation Council Guidelines for Resuscitation 2005. Section 7. Cardiac arrest in special circumstances. Resuscitation 67S1, S135-S170