

Sports Diver Theory Lesson – ST2

DIVER RESCUE

Lesson Objectives

Students already know the initial elements of diver rescue, CBL, AS ascent and towing. This session builds on that knowledge so that together with the practical element of this lesson and following sheltered water lessons, they will be able to perform a complete rescue sequence.

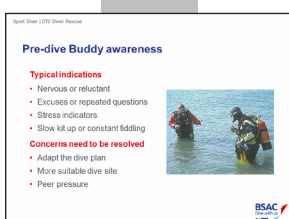
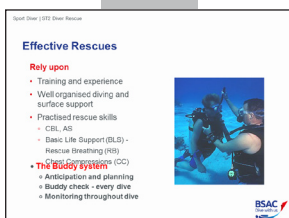
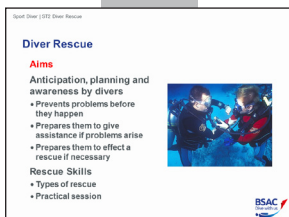
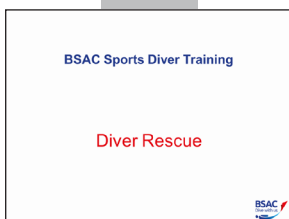
Achievement Targets

At the end of this lesson students will:

- Understand that anticipation, planning and awareness by divers can prevent problems before they happen, be prepared to give assistance if problems should arise and to effect a rescue if necessary.
- Understand that effective rescues rely on training, experience and practice
- Understand different types of rescue
- Understand the priorities of Basic Life Support
- Understand how to practically administer Rescue Breaths and Chest Compressions
- Understand that practical rescue skills learned in this lesson will be transposed to sheltered water lessons

The following items are mandatory for the practical part of this lesson

One resuscitation manikin between two students and manikin wipes. (Manikins should be checked prior to this lesson to ensure they are in clean working order and should also be thoroughly cleaned at the completion of this lesson)



DIVER RESCUE

Anticipation, planning and awareness

From the previous lesson, students learned that understanding varied conditions on dive sites is important when preparing to dive and that anticipation, planning and awareness by divers:

- Prevents problems before they happen
- Prepares them to give assistance if problems should arise
- Prepares them to effect a rescue if necessary

Rescue Skills

This lesson will cover:

- The types of rescue divers may become involved in
- A practical session

This includes a demonstration and practice of Basic Life Support skills, so that students can learn in the comfort of a classroom before transposing those skills into open water lessons.

EFFECTIVE RESCUES

This lesson is going to cover diver rescue and Basic Life Support. It will enable the practical skills learned during this lesson to be incorporated into sheltered water lessons in the Sports Diver course.

Effective diver rescue relies upon

- **Training and Experience**
- **Well organised diving and surface support**

If diving is properly organised, the skills and experience of those on the surface will be available to help with a rescue. As more experienced divers and with wider rescue skills, Sports Divers can take a more active role in this support group.

- **Practiced rescue skills**
 - CBL and AS ascents
 - Resuscitation, which includes rescue breathing (RB) of a casualty who is not breathing, and chest compressions (CC) together with RB, (called Basic Life Support) of a casualty who has no heart beat

And above all, a system that ensures if one diver is in trouble, another diver can come to their rescue

- **The Buddy system**
 - Underwater rescue is dependent on a good buddy so anticipation and planning by both divers is important
 - Buddy check. Even if a buddy pair has dived together many times, they should never become complacent and disregard a buddy check. Don't make assumptions that everything works and is correctly connected - it needs to be checked before every dive
 - Buddy diving not only involves monitoring depth, time and breathing gas on the dive but also each other in sharing and enjoying the experience and, if there is a problem, recognising and resolving it

PRE-DIVE BUDDY AWARENESS

When preparing to dive either with a regular buddy, or one with whom the diver is less familiar, monitoring their actions can indicate a potential problem.

Signs

Typical indications may include:

- Nervousness or reluctance about the dive
- Giving lots of excuses or repeatedly asking questions
- Stress indications such as becoming breathless or sweating, particularly when kitting-up
- Slow kitting up, hesitation, constant fiddling, or other delaying tactics

Concerns need to be resolved

If any of the above signs are present they need to be resolved before getting in the water.

- Adapt the dive plan
Perhaps the dive plan needs to be adapted to counter any buddy concerns. Most divers will admit to having been slightly nervous before some dives. It is simply being honest if a diver warns their buddy that they do not want to rush or push their own limitations.
- More suitable dive site
Perhaps another dive site would be more suitable
- Peer pressure
It may be that the buddy doesn't really want to dive on that particular day, but may be trying to do so because they feel guilty about spoiling their buddy's or a dive group's dive. A good buddy should understand and would rather enjoy diving together on another day or another site than dive with uncertainty, worry and the inherent increased potential for problems

Scuba Dive - (ST2) Diver Rescue

Buddy awareness on a dive

Buddy reactions

- Stopping for no reason
- Preoccupation with kit
- Slow response to signals
- Rapid breathing
- Wide staring eyes

Resolve quickly

- Stop or move to buddy
- OK? Problem?
- Not OK, gentle but firm contact
- Abort dive



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BUDDY AWARENESS ON A DIVE

Buddy reactions

Any change to normal reactions may indicate there is a problem developing. Indications of this are:

- Stopping for no apparent reason
- Becoming pre-occupied with kit
- Slow response to signals
- Breathing rate increases
- Eyes begin to widen or stare

All are signs are that the buddy is not comfortable on the dive. Perhaps because of the conditions, finning too fast and getting exhausted, etc.

Taking action at an early stage can contain the situation and avoid a deterioration into panic.

Resolve quickly

- Stop and move close to buddy
- Give 'OK'? Signal - What is the problem?
Try to establish what the problem is. If it can be resolved and the dive continues, keep a watchful eye that it doesn't recur
- Not OK, gentle but firm contact
If the response from the buddy is not OK, make gentle but firm contact - it is not only reassuring but demonstrates that help is at hand and:
- Abort the dive
Depending on the buddy's condition, a normal ascent in close contact should be made

Scuba Dive - (ST2) Diver Rescue

Rescue - to the surface

Diver out of gas

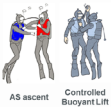
- AS ascent

Incapable/unconscious diver

- CBL

Rescue ascents - Urgent

- Ascend directly to surface
- May mean ignoring decompression stops
- Divers safer at surface
- DCI can be treated
- Actions to take in case of oxygen convulsions



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RESCUE - TO THE SURFACE

If the underwater problem is more serious, such as an out of air situation, or an unconscious diver, immediate assistance or rescue is paramount.

Diver out of gas

- AS ascent
Buddy takes octopus, or octopus is donated, firm contact is made by rescuer to establish control for the ascent

Incapable or unconscious

A CBL needs to be made

Rescue ascents - are urgent

- Ascend directly to surface
With an unconscious casualty the only place where resuscitation can take place is on the surface
There is an breathing gas problem that is not resolved by a controlled AS ascent, the surface must be reached
- Ignore decompression stops
Rescues may generally mean ignoring decompression stops. In the case of well controlled AS ascents and where an adequate breathing gas supply is available, it may be possible to carry out any required decompression stops
- Divers are safer at the surface
- DCI can be treated
- Where a casualty is suffering from convulsions due to oxygen toxicity,, allow the casualty to reach the relaxed phase before lifting to the surface



SURFACE TOWS TO SHORE

Summon help

Any rescue is an urgent situation. Summoning help not only means others can possibly assist in the water but also make early contact with the emergency services

- Ensure casualty buoyant at surface
 - Fully inflate their BC and keep their face clear of water
 - Consider removing weights to effect greater re-buoyancy
 - Summon assistance.

Conscious casualty

- Reassure
This is important as the sound of a friendly, supportive voice will help to keep the casualty calm by knowing that they are in good hands. It will also help them relax, which will make towing much easier for the rescuer

Unconscious casualty

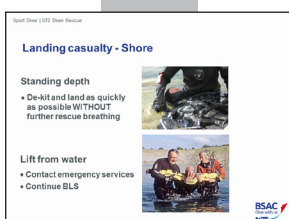
- Remove mask and mouthpiece and extend the airway when towing an unconscious but breathing casualty

Non-Breathing casualty

- Remove mask and mouthpiece and administer rescue breaths for one minute (10 RBs) - following an ascent to the surface, this should be done before summoning help. Only commence towing towards the shore if no assistance is available. When towing to shore speed is essential and you should concentrate on towing and do not attempt further Rescue Breaths. This is not a tablet of stone, as the need for RB has to be balanced against the need to urgently remove the casualty from danger, the water.

LANDING CASUALTY - SHORE

For Sports Diver, the rescue practical lessons will include static RB and a tow to the shore, followed by landing the casualty.

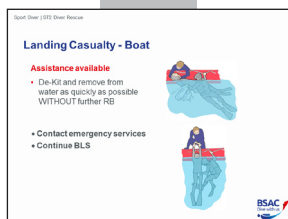


Standing depth

Is the easiest place to remove all equipment before landing the casualty

- Effectiveness again has to be balanced against the urgency to remove the casualty from danger, the water
- De-kit and land the casualty as quickly as possible without further RBs
- Continue basic life support until assistance arrives
- If it has not already happened, the rescuer needs to arrange for someone to contact the emergency services
- The rescuer should remain with the casualty and continue first aid. When the emergency services arrive they should be given all details of the incident and first aid given

No two rescues will be the same. The likelihood is that there will be other divers able to render assistance from an early stage in the rescue. Whatever a rescuer does they will, by force of circumstance, have to compromise to achieve the best they can at the time. Because of the stress and exertion involved in a rescue, the more qualified assistance there is, such as good surface support, the more they can help and assist the rescuer as soon as possible.



LANDING CASUALTY - BOAT

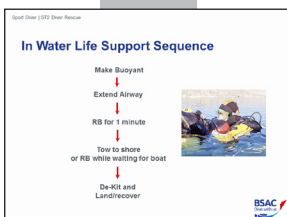
With a boat's available crew, the rescuer should not have to tow the casualty, as the boat should come to them. After signalling for help the rescuer should continue to give RB until the boat arrives.

Assistance available

from boat occupants

- Don't try to continue RB at the boat prior to landing
- Help de-kit and remove casualty from water as quickly as possible without further RBs
- Someone who can contact the emergency services immediately
- Can assist with continuing first aid

Note: The following VA's can be used in conjunction with the Instructor practical demonstrations



IN WATER LIFE SUPPORT SEQUENCE

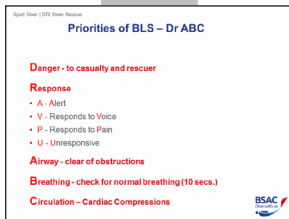
The casualty must be removed from water by the fastest and safest means possible, and in doing so the rescuers should be aware of their personal safety and to minimise danger to themselves and the casualty at all times.

In water life support

- Make a firm hold on the casualty and maintain this throughout the rescue.
- Ensure positive buoyancy for both casualty and rescuer.
- Extend casualty's airway.
- Give RB for one minute (10 RBs).
- Summon assistance
- Tow without further RB or continue RB while waiting for boat
- In standing depth De-Kit and land casualty as quickly as possible without further RB
- Continue BLS on land/boat.

If the initial rescue breaths do not make the casualty's chest rise as in normal breathing, then before the next attempt:

- Check the casualty's mouth and remove any obstruction
- Re-check that there is adequate head tilt and chin lift



PRIORITIES OF BASIC LIFE SUPPORT

Implementing the priorities of basic life support needs to be considered in the context of the normal diving situation where there are almost inevitably other divers around to help

The order of priorities can be remembered using D r A B C

Danger - to the casualty and rescuer - water is the danger so both need to be landed either to the safety of the shore or boat

Response - the condition of the casualty.

- A - the casualty is Alert
- V - the casualty responds to Voice
- P - the casualty responds to Pain
- U - the casualty is Unresponsive

If the casualty is unconscious/unresponsive check them using

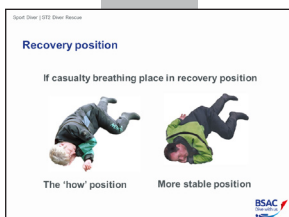
Airway
Breathing
Circulation

AIRWAY

Demonstrate using manikin

Check for a clear airway

- **Foreign objects**
Remove any foreign objects, loosen clothing around neck, remove loose dentures but well fitting ones can remain
- **Tongue**
In an unconscious casualty laid on their back, the relaxed muscles of the tongue will allow it to sag downwards and block the airway
- **Neck extension**
A neck extension/jaw lift raises the tongue to clear the airway.



RECOVERY POSITION

Demonstrate on live volunteer casualty

If the casualty is breathing, place them in the recovery position

- The 'how' position
- More stable position for boats

The added stability of the second position is of benefit when the casualty is subject to the motion of a boat. Placing an unconscious breathing casualty in a recovery position is more important than the precise details of which position it is.




- Casualty's right arm placed either in the 'how' position or underneath the casualty's buttock (note: ensure that the hand is placed well underneath the soft part of the buttock - not under the point of the pelvic bone - and that the palm is against the buttock, not flat on the floor)
- Casualty's left leg bent at knee and used as lever to roll casualty towards you
- Head protected during roll
- Left arm/leg keep pressure off chest
- Head placed on hand, angled downward to ensure drainage of any fluid.

Small Diver (ST2) Diver Rescue

Unresponsive Casualty

If casualty not responding and not breathing

Administer CC and RB


Small Diver (ST2) Diver Rescue

Basic Life Support - Decision process & Sequence

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    graph TD
        Q1[Unresponsive?] -- No --> A1[Leave Casualty and get help]
        Q1 -- Yes --> A2[Shout for help, open up airway]
        A2 --> Q2[Breathing Normally?]
        Q2 -- No --> A3[Call help, leave if necessary SCCCRR (020)]
        Q2 -- Yes --> A4[Recovery Position]
    
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Stop to recheck only if breathing resumes, else continue until:
 - Qualified help arrives
 - Normal breathing
 - You are exhausted



Small Diver (ST2) Diver Rescue

Basic Life Support

- Sequence of 30 compressions: 2 breaths by one rescuer
- Monitor effectiveness
- Stop if normal breathing resumes/medical assistance arrives
- Two rescuers: change role every 2 minutes

UNRESPONSIVE CASUALTY

If the casualty is not responding and not breathing

- No response
- No chest movement
- No feel of air movement

Administer cardiac compressions (CC) and rescue breaths (RB)

BASIC LIFE SUPPORT - DECISION PROCESS & SEQUENCE

Check casualty for responsiveness

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

If the casualty responds:

- Leave him in the position found
- Try to find out what is wrong and get help if needed
- Reassess the casualty regularly

If the casualty does not respond:

- Shout for help
- Turn casualty onto back and open airway
- Prepare to give RB

Check for normal breathing

- Look for chest movement
- Listen at the casualty's mouth for breath sounds
- Feel for air on your cheek
- Any doubt as to whether breathing is normal, act as if it is not normal.

If the casualty is breathing normally

- Turn into the recovery position
- Send or go for help
- Check for continued breathing

If the casualty is not breathing normally

- Send for help/go for help. Return and start chest compressions
- Administer cardiac compressions at a rate of 100-120/min
- After 30 compressions open airway again and give 2 RBs
- Repeat the sequence of 30 chest compressions to 2 rescue breaths (30:2)
- Stop to re-check the casualty only if breathing normally

BASIC LIFE SUPPORT

In a diving situation it is unlikely that a lone rescuer will initiate BLS on land or in a boat. It is likely that BLS will have been initiated in the water by a lone rescuer, but once the casualty is out of water other members of the diving group will be available to help.

Consolidate:

- 30 Compressions : 2 breaths (30:2) by one rescuer.



- Monitor the effectiveness of the BLS
 - Maintain head tilt and chin lift
 - Remove mouth from victim and watch for the chest to fall
- Stop to recheck the victim only if he starts breathing normally
- If there is more than one rescuer, another should take over BLS every 1 to 2 minutes to minimise fatigue.

BASIC LIFE SUPPORT - CC

Demonstrate using manikin

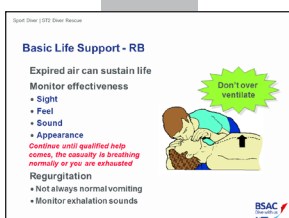
Cardiac arrest is diagnosed if a casualty is unresponsive and not breathing normally.

Basic Life Support encompasses rescue breathing and cardiac compressions only and emphasises the purpose of the technique, i.e. to maintain the viability of the casualty.

Sequence

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.
- Rescuer should place the heel of one hand in the centre of the chest.
- Place the heel of the other hand on top of the first hand.
- Interlock fingers.
- Position yourself vertically above the casualty's chest and, with your arms straight, press down on the sternum 5 - 6 cm.
- After each compression, release pressure on the chest without losing contact.
- Repeat at a rate of about 100-120 times/min.



BASIC LIFE SUPPORT RB

Demonstrate using manikin

- Expelled air can sustain life. The air normally inspired into the lungs contains approximately 21% oxygen. Some 4% is consumed by the body in metabolism, resulting in the expelled air still containing approximately 17%. The expired air thus contains adequate oxygen to sustain life and blowing expired air into a non-breathing casualty's lungs can ventilate the lungs with sufficient oxygen to sustain life.

Monitor effectiveness:

- Sight - watch the chest rise and fall. Use this to dictate the rate of ventilations
- Feel - any resistance to inflation of casualty's lungs
- Sound - particularly of casualty's exhalations
- Casualty's appearance - monitor for changes in the casualty's colour. A deterioration in colour indicates ventilation is not effective. In the diving situation, immersion in cold water may have a greater effect on the casualty's appearance and so this indicator should be used with caution.

Point out to students the risk of inflating the stomach if they ventilate too aggressively. A steady inflation until the chest visibly rises is all that is required.

Regurgitation Procedure

- **Not always normal vomit reaction**

The casualty will not necessarily vomit in the normally expected sense. While unconscious the muscles of the stomach and oesophagus can, like other muscles, relax. In a casualty laid flat, this can allow the stomach contents to trickle back up the oesophagus and pool at the back of the throat. If not detected, attempts at RB can then force this fluid into the



lungs

- **Monitor sounds of exhalation**

It is important to monitor the sounds of the exhalations to detect regurgitation of stomach contents - don't necessarily expect casualty to vomit in the more traditional sense

Demonstrate on live volunteer casualty the action for regurgitation of stomach contents/vomit

- Quick roll of casualty onto side
- Protect the head
- Head angled downwards to allow fluid to drain
- Initial check that fluid has drained
- Casualty rolled onto back, head protected
- Further check for clear airway before recommencing basic life support

Students to practice on each other the action for regurgitation of stomach contents/vomit

CASUALTY CARE

Tender loving care (TLC)

The rescuer's attitude is often significant in affecting the casualty's response and well-being

- At all times the casualty should be reassured and subjected to TLC. This is true even for apparently unconscious casualties, many of whom will still be aware of what their rescuers are saying about them
- If possible the rescuer should note down the incident history, i.e. signs of the problem and first aid actions applied, or get some else to do this for them. A written record with approximate timings can assist in the subsequent treatment of the casualty by qualified medical aid
- Depending on the circumstances, the rescuer may need to contact friends and family about the incident

Post incident support and considerations

- **Support if required**

If the rescuer, friends or family need any additional support, the BSAC HQ staff will be able to assist

- **Incident Reporting**

After the event, a BSAC Incident Report (available from HQ or from the BSAC website) should be filled in while all the details are fresh in everyone's minds. This is a confidential reporting system, which enables the BSAC to maintain a comprehensive database of incidents

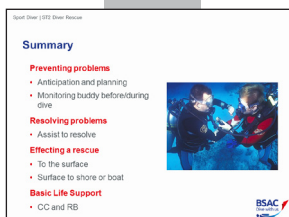
In addition to Incident Reports, other data is obtained from other rescue agencies and press reports. A summary report is published annually, which is analysed to determine trends or common causes, to monitor the effectiveness of BSAC training or to indicate where revisions or additions to our training procedures are required

- **Successful rescues**

There is a tendency to consider incidents to be incidents only when the outcome is adverse. Reports for successfully resolved incidents are just as important as for those that are unsuccessful as much, if not more, can be learned from them

Feedback important

The feedback from incidents is an important part of maintaining the safety record of our sport.



SUMMARY

This lesson has addressed how early identification of potential problems can assist in avoiding them or minimising their impact. Where problems do occur, use of appropriate rescue techniques is essential for speedy and effective resolution. This lesson has described relevant techniques for assisting or rescuing a casualty, together with resuscitation techniques.