



World Water Safety

INTERNATIONAL LIFE SAVING FEDERATION

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MEDICAL POSITION STATEMENT - MPS 08

IN WATER RESUSCITATION

BACKGROUND

Whenever an apparently non-breathing victim is found in the water, the rescuer is confronted with a difficult choice. Should the rescuer attempt resuscitation procedures in the water or should the rescuer bring the victim to shore first, then attempt resuscitation?

The hypoxia (oxygen starvation) caused by prolonged submersion results first in cessation of breathing (1,3,4,5,6,7). If this hypoxia is not corrected quickly, respiratory arrest is followed by cardiac arrest at a variable but short time interval determined by physical condition of the victim, water temperature, previous hypoxia, emotional state, and associated diseases (1,3,5,8,10,11).

When respiratory arrest is corrected prior to onset of cardiac arrest, the death rate is less (0% to 44%) than in those cases where full CPR (including chest compressions) is needed (33% to 93%) (1,3,5). For these reasons, in cases of respiratory arrest without cardiac arrest while the victim is still in the water, the time involved in rescue will be enough, in the majority of cases, to result in cardiac arrest. This will lead to an increase in the likelihood of death (1,3,5). If hypoxia can be corrected in the water, before cardiac arrest takes place, the victim's chance of survival increases significantly.

Ventilation in deep water using a rescue board was demonstrated in Australia by Surf Life Saving New Zealand in 1975. Deep water ventilation using a rescue board subsequently became part of lifeguard training in Australia in 1976 (1). In 1978, during a World Lifesaving Association medical conference in California, it was agreed that artificial ventilation with the aid of a flotation device should be employed in any case in which there is a delay in removing the non-breathing victim from the water. No successful resuscitation in the water was reported until 1981, although several lifesaving organizations worldwide had been teaching the use of artificial ventilation in the water (2).

Water temperature and known time of submersion, are the main factors in the chance of survival and will influence decisions on resuscitation. Small children have been known to survive submersion in icy water for more than one hour (22). Such certainty of knowledge is,

however, rare and if submersion time is uncertain in more temperate conditions, resuscitation should be commenced as early as possible. Further, pulse checks in the water are highly unreliable and waste time. Cardiac compressions in the water have been evaluated and the procedure is not effective.

In most cases, the rescuer does not know all the circumstances related to the victim before the rescue is attempted, and the resuscitation window decreases with time. The proper training for different situations, with or without lifesaving equipment, will improve the rescuer's ability to make the right decision and select the right rescue equipment for the circumstances. By maintaining good physical conditioning and using the correct rescue techniques the rescuer can avoid unnecessary risks to both the rescuer and victim.

In considering the best course of action in treating a non-breathing victim in the water, lifeguards and other in-water rescuers have raised several questions:

What if the victim is actually breathing and the rescuer mistakenly gives ventilations?

It can be difficult to determine whether an unconscious victim is breathing spontaneously while the rescuer and victim are still in the water. Even so, if the rescuer ventilates a breathing victim, it is very unlikely to have a negative impact. On the other hand, ventilating a victim who is not breathing may revive the victim, or at least maintain circulation.

If the victim is in cardiac arrest, won't the time involved in giving ventilations in the water delay CPR, early defibrillation, and other critical interventions?

There will indeed be a delay, but the brief time involved in trying to immediately restart breathing is the best approach. The higher death rate resulting from cardiac arrest (33% to 93%) versus respiratory arrest alone (0% to 44%) justifies the risk of attempting in-water resuscitation immediately. In the majority of these cases, breathing is usually restored by "mouth-to-mouth" ventilation in the first minute (1,8).

Doesn't mouth-to-mouth place the rescuer at higher risk of contracting a communicable disease?

Studies suggest that the chance of contracting a communicable disease via mouth-to-mouth resuscitation attempts is extremely small. On the other hand, the chance of saving a life in these cases is high. Rescuers should take this into account in deciding the best course of action. If the rescuer has a barrier device, it may be used, but these devices are usually very difficult to use in-water and attempts to use them may add further delays.

What if the water conditions are such that the rescuer or victim are endangered (e.g. high surf, very cold water, etc.)?

If the rescuer is to successfully assist the victim, the rescuer must maintain a reasonable degree of safety. If the rescuer cannot safely provide ventilation at the location where the victim is found, then the rescuer should immediately move to a position of safety. This may be elsewhere in the water (such as further offshore), on-shore, into a rescue boat, etc.

STATEMENT

Whenever possible, if a victim is found in the water, the rescuer should immediately establish whether spontaneous breathing is present and, if it is absent, initiate artificial ventilation. Exceptions include threats to the safety of the rescuer and victim if immediate

rescue is not initiated and cases of **known** submersion over 15 minutes (12,13). Initiating artificial ventilation while still in the water in cases of isolated respiratory arrest may improve chances of survival of the non-breathing victim by more than 50% (1,3). The rescuer's ability to perform this procedure will depend on factors such as water conditions at the location of the incident (surf, currents, etc.), the availability of a rescue flotation device (rescue buoy, rescue tube, rescue board, etc.), rescuer training, physical conditioning of the rescuer, and the techniques used.

Specific recommendations for different water depths are as follows in cases where the submersion time is unknown or is **known** to be less than 15 minutes:

Shallow Water (if the rescuer can stand on the bottom)

Open the victim's airway by extending the victim's neck, evaluate the victim's breathing, and, if the victim is not breathing, begin one minute of mouth-to-mouth ventilation (12 to 16 ventilations). If ventilations are restored at any time during the first minute of ventilation, proceed towards shore and stop to check from time to time that the victim is still breathing.

If breathing is not restored after one minute of ventilation, the rescuer should rescue the victim while ventilations are continued or stop every one or two minutes to ventilate again for approximately one minute (12 to 16 ventilations). This may be done without great difficulty and without lifesaving equipment. Attempt to prevent unnecessary neck movement if there is a suspicion of head or neck trauma.

Deep water

Note: In general, only trained lifeguards have the skills to perform rescue breathing in deep water.

Position the victim face up, extending the neck to open the airway. This can be accomplished by a single trained rescuer with the aid of appropriate lifesaving equipment (a rescue tube, rescue can, rescue board, bodyboard, etc.) or by two or more trained rescuers without lifesaving equipment. In either case, swim fins are highly recommended and will greatly facilitate these procedures.

If there is no spontaneous breathing, the rescuer should attempt to ventilate for approximately one minute (12 to 16 ventilations), and then proceed depending on circumstances.

If ventilation is restored, proceed toward shore intermittently stopping to check that the victim is still breathing.

If breathing is not restored after one minute of ventilation, the rescuer should consider if it is a long (over five minutes) or a short swim to a dry or shallow place. If a short swim, rescue the victim while ventilations are continued or stop every one or two minutes to ventilate again for approximately one minute (12 to 16 ventilations). If a long swim, continue ventilation one additional minute in place and check for movement or reaction to ventilation. If present, use the same procedures as with the short swim. If movement or reaction to ventilation is absent, the rescuer should bring the victim to shore without further ventilations.

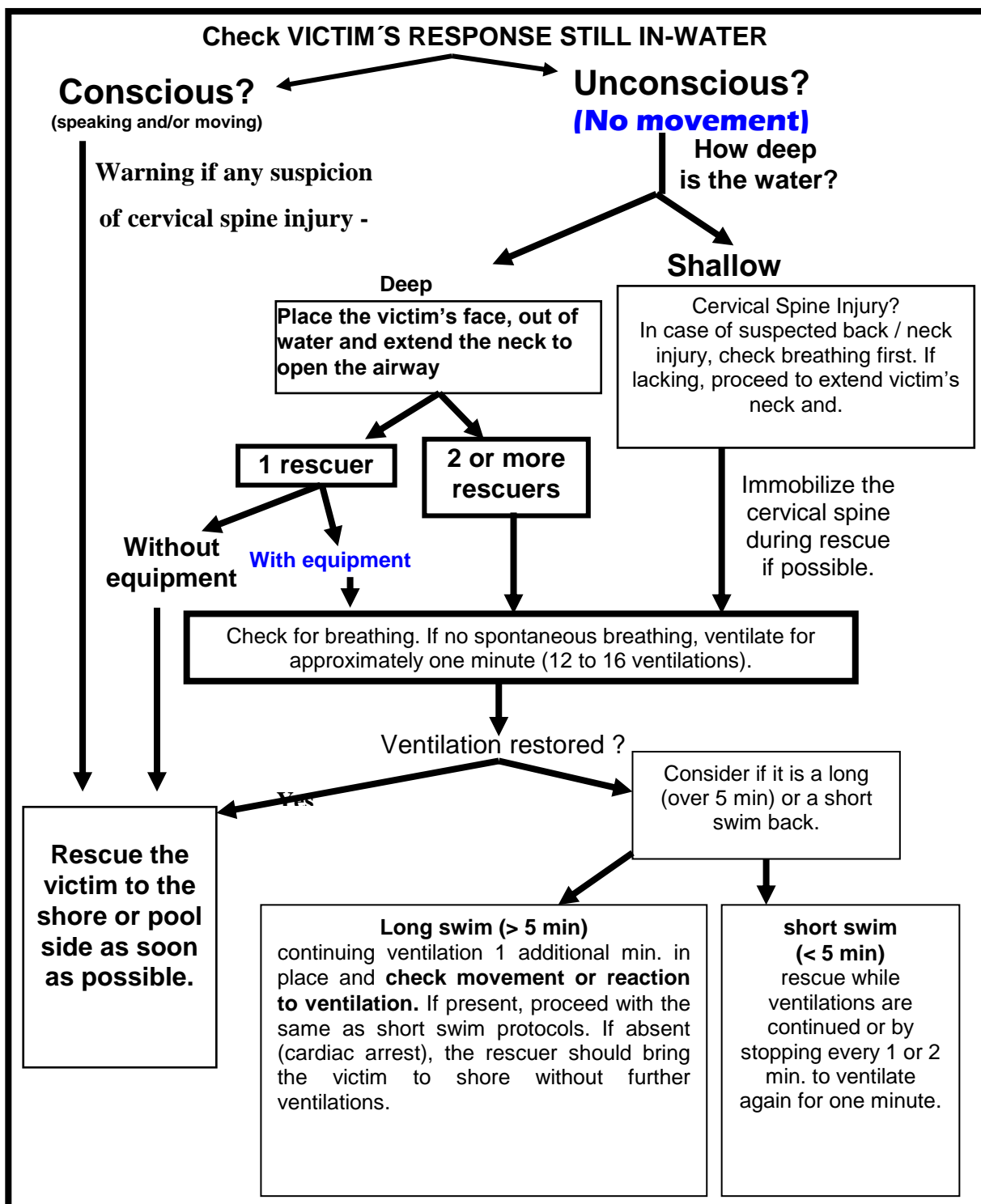
When performed in deep water, this is a difficult procedure, requiring extreme fitness, swimming ability, a flotation device and prior training. Do not check victim's pulse or attempt

compressions while in the water (21). These are difficult and inefficient, and will slow the rescue process.

In case of a suspected back or neck injury the rescuer should check breathing before extending the victim's neck, then if there is no breathing, tilt the victim's neck backwards to check for breathing again. If there is no spontaneous breathing the rescuer should immediately start ventilations (1,21) consistent with the rescuer's training protocol. Suspicions of back/neck injury should be greater in shallow water.

The rescuer should always keep the victim under observation during the rescue, even if the victim is breathing spontaneously, since during the first 5 to 10 minutes the victim could again cease breathing (1).

ALGORITHM - IN-WATER RESUSCITATION PROCEDURES



In-Water Basic Life Support – Szpilman 2001 (references below).

Note: recommendations for in-water resuscitation are for cases where the submersion time is unknown or is known to be less than 15 minutes. If breathing is not restored after one minute of ventilation in shallow water, proceed with short swim procedure.

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