

Appendix

Medical management of DCS - Capsule Program

The treatment of decompression sickness (DCS) is based on hyperbaric oxygen therapy, which consists of inhaling oxygen under pressure. In the context of the capsule, a FiO_2 close to 100% can be used, in order to obtain a PpO_2 at 280 kPa, which is usually used in hyperbaric therapy with a very low risk of hyperoxic seizure. Oxygen will be supplied by means of a closed-circuit rebreather set up in the capsule with PpO_2 at 280 kPa in manual control.

In the case of a Type I DCS and if the symptoms resolve under oxygen in the capsule, medical monitoring may be carried out for a few hours before considering a final decompression.

Decompression should ideally be performed on a closed-circuit rebreather along a fixed decompression line. The diver should not make any effort during the decompression.

A PpO_2 at 190 kPa should be maintained throughout the final decompression and then with a FiO_2 at 100% from 9 msw onwards, with the total oxygen exposure time remaining below the REPEX oxygen toxicity thresholds.

After this initial care, and even if the symptoms have resolved, the diver should be evacuated to the hyperbaric chamber in Papeete, maintaining oxygenation at all times during the evacuation.

In the vicinity of the capsule, a closed-circuit rebreather should be reserved in case of an accident and should be available at all times. The capacities of the soda lime cartridge and the oxygen cylinder should be compatible for continuous use for at least 6 hours, or a change of closed-circuit rebreather should be considered.

In addition, 3 decompression lines will be ready to be deployed at any time to which face masks can be fitted.

4 situations should be considered:

- 1- ADD that occurs during an excursion
- 2- ADD that occurs on return from a capsule excursion
- 3- ADD that occurs during final decompression in water

4- ADD that occurs after returning to the surface

ADD that occurs during an excursion	
<p>Type I DCS suspected</p>	<p>Notify partner. Abort the dive and return to the capsule at PpO₂ 160 kPa.</p> <p>Alert the surface upon arrival in the capsule. In the capsule, breathing on a closed-circuit rebreather ideally (or other oxygen therapy device depending on the case) with PpO₂ at 220 kPa for 1 hour in sequential mode: 30 min O₂-break in ambient 5min-30 min O₂ with the possibility of increasing PpO₂ to 280 kPa in the absence of response. The medical diver intervenes in the capsule and proposes a symptomatic treatment according to the symptoms (analgesics...). At the end, preparation and transfer of the injured diver to the surface on a closed-circuit rebreather with a PpO₂ at 190 kPa until 9 msw and then in 100% FiO₂.</p> <p>Medical decision for possible transfer to the hyperbaric chamber.</p>
<p>Type 2 DCS suspected</p>	<p>Notify partner. Abort the dive and return to the capsule at PpO₂ 160 kPa.</p> <p>Alert the surface upon arrival in the capsule. In the capsule, breathing on a closed-circuit rebreather ideally (or other oxygen therapy device depending on the case) with FiO₂ close to 100% for a PpO₂ at 280 kPa for 1 hour in sequential mode: 30 min O₂-break in ambient 5min- 30 min O₂. The medical diver intervenes in the capsule and proposes a symptomatic treatment according to the symptoms. In the event of persistent symptoms and in particular in the presence of severe dizziness and/or vomiting, the oxygenation period in the capsule is extended to a total of 2 hours with reinforced symptomatic treatment. At the end, preparation and transfer of the injured diver into the water for the ascent to the surface, ideally on a closed-circuit rebreather with a PpO₂ at 190 kPa up to 9 msw, then in 100% FiO₂.</p> <p>If necessary, decompression on a decompression line using a standard regulator or full face mask. The decompression line will be made up of Heliox breathing mixed gas suitable for PpO₂ at 190 kPa to 9msw and then at 100% FiO₂. Decompression is extended to 6 hours with a first stop at 18m / 1 hour.</p> <p>On the surface, continuation of normobaric oxygenation with high concentration oxygen mask 15l/min and evacuation to the hyperbaric chamber.</p>

ADD that occurs after returning from an excursion in the capsule	
Type I DCS suspected	<p>Alert the surface immediately. Switch to a closed-circuit rebreather ideally (or other oxygen therapy device depending on the case) with PpO₂ at 220 kPa for 1 hour in sequential mode: 30 min O₂-break in ambient 5min- 30 min O₂ with the possibility of increasing the PpO₂ to 280kPa in the absence of response. The medical diver intervenes in the capsule and proposes a symptomatic treatment according to the symptoms (analgesics...). At the end, preparation and transfer of the injured diver to the surface on a closed-circuit rebreather with a PpO₂ at 190kPa until 9msw and then in 100% FiO₂.</p> <p>Medical decision for possible transfer to the hyperbaric chamber.</p>
Type 2 DCS suspected	<p>Alert the surface immediately. Switch to a closed-circuit rebreather ideally (or other oxygen therapy device depending on the case) with FiO₂ close to 100% for a PpO₂ at 280 kPa for 1 hour in sequential mode: 30 min O₂-break in ambient 5min- 30 min O₂. The medical diver intervenes in the capsule and proposes a symptomatic treatment according to the symptoms. In the event of persistent symptoms and in particular in the presence of severe dizziness and/or vomiting, the oxygenation period in the capsule is extended to a total of 2 hours with reinforced symptomatic treatment. At the end of this period, preparation, and transfer of the injured diver into the water for the ascent to the surface, ideally on a closed-circuit rebreather with a PpO₂ at 190 kPa up to 9 msw, then in 100% FiO₂. If necessary, decompression on a decompression line using a conventional regulator or full-face mask. The decompression line will be made up of Heliox breathing mixed gas suitable for PpO₂ at 190 kPa to 9 msw and then at 100% FiO₂. Decompression is extended to 6 hours with a first stop at 18m / 1 hour.</p> <p>On the surface, continuation of normobaric oxygenation with high concentration oxygen mask 15l/min and evacuation to the hyperbaric chamber.</p>

ADD that occurs during final decompression	
All DCS suspected	<p>Notify partner. Alert the surface immediately with yellow signaling inflatable buoy. Continue breathing on a closed-circuit rebreather, if possible, with a PpO₂ at 190 kPa down to 9 msw, and FiO₂ 100% above. If necessary, decompression on a decompression line using a conventional regulator or full-</p>

	<p>face mask. The decompression line will be made up of Heliox breathing mixed gas suitable for PpO₂ at 190 kPa to 9 msw and then at 100% FiO₂.</p> <p>The medical diver intervenes to confirm the diagnosis. Recompression to 3msw above the symptom pressure for one hour before resuming decompression with the full planned decompression time without reducing the decompression time.</p> <p>Maintain PpO₂ at 190 kPa throughout decompression to 9msw and then at 100% FiO₂.</p> <p>On the surface, continuation of normobaric oxygenation with high concentration oxygen mask 15l/min and evacuation to the hyperbaric chamber.</p>
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ADD that occurs after returning to the surface	
All DCS suspected	<p>The diver is immediately de-equipped and placed on normobaric oxygenation at 15 L/min with a high concentration oxygen mask and thermal protection. The diver is taken over by the surface safety divers to begin medical treatment. The assistance diver doctor takes charge of the injured diver as soon as possible and prepares the evacuation to the hyperbaric chamber in Papeete with the local health care structures.</p>