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Defence nationale

B-GG-380-000/FP-005

CANADIAN FORCES DIVING MANUAL

VOLUME 5

**HYPERBARIC CHAMBER –
OPERATION AND TREATMENT
PROCEDURES**

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DIVING EMERGENCY ASSISTANCE / MEDICAL CONSULTATION CANADA

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Panama City, FL 24 Hours (850) 230-3100 FAX (850) 234-4238	Davis Hyperbaric Center Brooks City-Base, San Antonio, TX VOICE DSN240-3281 VOICE COM(210) 536-3281 FAX DSN240-2944 FAX COM(210) 536-2944	24-hr emergency hotline +1 (919) 684-8111

First Aid FOR Emergencies

To handle an emergency situation, use **Emergency Scene Management (ESM)**.

- 1 Take charge.
- 2 Call out for help.
- 3 Assess hazards and make the area safe.
- 4 Find out what happened.
- 5 Identify yourself and offer to help.
- 6 If head or spinal injuries are suspected, support the head and neck.
- 7 Assess responsiveness.
- 8 Send or go for medical help.

Note: Protect yourself and others by wearing non-latex gloves when giving first aid. Use a shield or face mask with a one-way valve when giving CPR.

Cardiopulmonary Resuscitation (CPR – Adult)

- 1 Open airway – push back on forehead and lift chin.
- 2 Check breathing. If the casualty is not breathing...
- 3 Pinch nose and make a tight seal over the mouth. Give 2 breaths.
- 4 Make sure casualty is on a firm flat surface.
- 5 Place hands on centre of chest.
- 6 Position shoulders directly over hands and keep elbows locked.
- 7 Compress firmly 30 times then give 2 breaths. Push hard - Push fast
- 8 Continue cycles of 30 compressions and 2 breaths until help arrives.



OPEN AIRWAY



CHECK BREATHING



BREATHE INTO CASUALTY TWICE



POSITION YOUR HANDS IN THE CENTRE OF THE CHEST



PRESS DOWN FIRMLY 30 TIMES, THEN GIVE 2 BREATHS. CONTINUE CPR UNTIL HELP ARRIVES



BREATHE INTO CASUALTY TWICE

Choking (Adult)

If a choking person can speak, breathe or cough – **STAND BY** and encourage coughing.

If a conscious person cannot speak, breathe or cough:

- 1 Stand behind person and find top of the hip bones with your hands.
- 2 Place a fist midline against the abdomen.
- 3 Grasp fist with other hand and press inward and upward forcefully.
- 4 Continue until object is expelled or person becomes unconscious.



FIND TOP OF HIPBONES



PLACE FIST MIDLINE ON ABDOMEN



PRESS INWARD AND UPWARD

If the person becomes unconscious ease him or her to the ground and send for medical help

- 1 Open the mouth and look for obstruction.
- 2 Open the airway and check breathing. If not breathing...
- 3 Give two breaths. If air doesn't go in the first time, reposition the head and try again.
- 4 Begin CPR. Give 30 compressions.
- 5 Each time you finish 30 compressions, look in mouth before giving the first breath.

Bleeding To control severe bleeding

Immediately apply direct pressure to the wound over a pad of dressings
Keep the casualty lying down



CONTROL BLEEDING IMMEDIATELY

Unconsciousness

Get medical help. Make certain person is breathing and then place the casualty in the recovery position. If the casualty is not breathing, start CPR



RECOVERY POSITION

Emergency Numbers

AMBULANCE _____

FIRE _____

POLICE _____

FAMILY DOCTOR _____

POISON INFORMATION CENTRE _____

NOTE: This poster is a step-by-step guide to what you can do until medical help arrives. These tips do not take the place of first aid training.



9901/10/00

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Premiers soins EN cas d'urgence

Pour faire face à une situation d'urgence, appliquez les principes de la Prise en charge d'une situation d'urgence (PCSU).

- 1 Prenez la situation en main.
- 2 Appelez à l'aide.
- 3 Évaluez les dangers et rendez les lieux sûrs.
- 4 Déterminez les circonstances de l'incident.
- 5 Indiquez que vous êtes secouriste et offrez votre aide.
- 6 Si vous soupçonnez une blessure à la tête ou à la colonne vertébrale, soutenez la tête et le cou de la victime.
- 7 Évaluez la faculté de réponse de la victime.
- 8 Envoyez quelqu'un chercher des secours médicaux ou allez-y vous-même.

Nota : Assurez votre sécurité ainsi que celle des autres en portant des gants lorsque vous donnez les premiers soins. Utilisez un écran protecteur ou un masque à soupape unidirectionnelle lorsque vous pratiquez la RCR.

La réanimation cardio-respiratoire (RCR - Adulte)

- 1 Ouvrez les voies respiratoires – renversez la tête vers l'arrière en appuyant sur le front du sujet et soulevez le menton.
- 2 Surveillez la respiration. Si le sujet ne respire pas...
- 3 Pincez les narines du sujet et assurez un contact hermétique à la bouche. Donnez deux insufflations.
- 4 Assurez-vous que la victime se trouve sur une surface ferme et plate.
- 5 Placez deux mains au centre de la poitrine
- 6 Placez vos épaules directement au-dessus des mains et garder les coudes immobilisés.
- 7 Exercez de fortes poussées (30 fois) et donnez 2 insufflations.
- 8 Continuez le cycle de 30 fortes poussées et de 2 insufflations jusqu'à ce que les secours médicaux prennent la relève.



OUVREZ LES VOIES RESPIRATOIRES.



VÉRIFIER LA RESPIRATION



DONNEZ DEUX INSUFFLATIONS AU SUJET.



PLACEZ VOS MAINS SUR LE CENTRE DE LA POITRINE.



EXERCEZ 30 FORTES POUSSÉES ET DONNEZ 2 INSUFFLATIONS. RÉPÉTEZ JUSQU'À CE QUE LES SECOURS MÉDICAUX PRENNENT LA RELÈVE.



L'hémorragie Pour réprimer une hémorragie grave

Exercez immédiatement une pression directe sur la plaie couverte d'un pansement si vous en avez un. Gardez la victime allongée.



RÉPRIMEZ IMMÉDIATEMENT L'HÉMORRAGIE.

L'inconscience

Envoyez quelqu'un chercher des secours médicaux. Assurez-vous que la victime respire puis placez-la en position latérale de sécurité. Si la victime ne respire pas commencer la RCR.



POSITION LATÉRALE DE SÉCURITÉ

L'étouffement (Adulte)

Si la victime peut parler, respirer ou tousser – TENEZ-VOUS PRÊT à intervenir et encouragez-la à tousser.

Si la victime est consciente mais qu'elle ne peut ni parler, ni respirer, ni tousser :

- 1 Placez-vous derrière la victime et repérez le dessus des os des hanches à l'aide de vos mains.
- 2 Placez un poing dans l'axe médian de l'abdomen.
- 3 Saisissez le poing avec votre autre main et exercez de fortes poussées vers l'intérieur et vers le haut.
- 4 Continuez jusqu'à ce que l'objet soit délogé ou que la victime perde conscience.



RÉPÉREZ LE DESSUS DES OS DES HANCHES.



PLACEZ UN POING DANS L'AXE MÉDIAN DE L'ABDOMEN.



EXERCEZ DE FORTES POUSSÉES VERS L'INTÉRIEUR ET VERS LE HAUT.

Si la victime perd conscience, allongez-la sur le sol et faites dépêcher des secours médicaux :

- 1 Ouvrez-lui la bouche et recherchez le corps étranger. Retirez-le si vous le voyez.
- 2 Ouvrez les voies respiratoires et surveillez la respiration. Si la victime ne respire pas...
- 3 Donnez deux insufflations. Si vous ne parvenez pas à donner une insufflation au premier essai, replacez la tête et essayez à nouveau.
- 4 Commencez à administrer la RCR. Exercez 30 fortes poussées.
- 5 Chaque fois que vous avez terminé d'exercer 30 fortes poussées, ouvrez la bouche de la victime et cherchez s'il s'y trouve un corps étranger avant de donner la première insufflation.

Numéro de téléphone en cas d'urgence

AMBULANCE _____

SERVICE D'INCENDIE _____

POLICE _____

MÉDECIN DE FAMILLE _____

CENTRE ANTIPOISON _____

NOTA : Cette affiche est un guide qui vous indique quoi faire, étape par étape, jusqu'à l'arrivée des secours médicaux. Ces conseils ne remplacent pas la formation en premiers soins.



Ambulance Saint-Jean
SAUVER DES VIES
au travail, à la maison et dans les loisirs

9901/10/00

FOREWORD

1. B-GG-380-000/FP-005, CF Diving Manual Volume 5 — Hyperbaric Chamber Operations, is issued on authority of the Chief of the Defence Staff.
2. This Volume is the principal reference document governing the conduct of all CF Recompression Chamber Operations and the treatment of decompression illness. Other volumes of the CF Diving manual comprise:
 - a. Volume 1 - History, Physics and Physiology of diving;
 - b. Volume 2 - Compressed Air Breathing Apparatus;
 - c. Volume 3 - Surface Supplied Breathing Apparatus; and
 - d. Volume 4 - Self-contained mixed gas diving.
3. The CF Diving manual is a controlled publication for issue solely to diving teams and schools in support of their diving operations/training. Volume 3, 4 and 5 are normally for the exclusive use of Clearance Diving Teams.
4. The content of this publication is presented in English only. The English/French version will be distributed as soon as it is provided by the translation bureau. Pending publication, inquiries in French can be forwarded to NDHQ D Dive S
5. Suggestions for amendments shall be forwarded through normal channels to National Defence Headquarters, Attention: Director of Diving Safety (D Dive S).

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CHAPTER 2

DIVING EMERGENCIES
REQUIRING RECOMPRESSION

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CHAPTER 2 DIVING EMERGENCIES REQUIRING RECOMPRESSION

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ADDENDUM TO CHAPTER 2

FOREWORD

1. This booklet has been prepared as an addendum to CF Diving Manual Volume 5 - Hyperbaric Chamber Operations. Its purpose is to provide CF Hyperbaric Chamber Staff with a complete set of treatment tables and procedures using the metric system of measurement.
2. Although the tables appear similar to those currently in use displaying the Imperial system of measurement there are subtle differences due to the conversion factors applied. The Director Diving Safety (D Dive S) and the Consultant of Diving and Hyperbaric Medicine (CDHM), CFEME, DRDC Toronto have endorsed these changes.
3. The booklet is to be used in conjunction with the CF Diving Manual Vol 5 and will remain in effect until the next scheduled rewrite. Any significant discrepancies between the two documents must be brought to the attention of the Director of Diving Safety (D Dive S) and the Consultant of Diving and Hyperbaric Medicine (CDHM), CFEME, DRDC Toronto.
4. Suggestions for amendments shall be forwarded through normal channels to National Defence Headquarters, Attention: D Dive S.

PREFACE

Metric Conversion Instructions

1. The following table will be used as a reference for converting from Imperial to Metric. The figures used were derived from: the Canadian Metric Practice Guide, CSA Z275.1-05 Annex D Pressure Conversion Table, and CSA Z275.2-04 Occupational Safety Code for Diving Ops. The values listed in the metric column have been rounded up or down (Hard Conversion) in order to establish the safest and most appropriate number to use. In all conversions, the number of significant digits retained should be such that the precision of the original value is neither significantly sacrificed nor exaggerated.

Example: When it is to be verified by means of a gauge graduated in bar that a cylinder is charged to 3000 psi, the pressure (3000 psi) should be converted to 205 bar and not 207 bar.

Task Requirement	Conditions	Imperial (Old)	Metric (New)
RCC Treatment Depths		30 fsw	9 msw
	5 Min air stop for TT 6 modified/TT 6A/TT 6A Modified	45 fsw	13.5 msw
		60 fsw	18 msw
		165 fsw	50 msw
	Max depth TT 8	225 fsw	70 msw
Pressure Tolerance Test		99 fsw	30 msw
Descent rates	Normal Dive Rate	60 fpm	18 mpm
Ascent rates	RCC Treatment	1 fpm	0.3 mpm (3 m/10 min)
Ascent rates	RCC Treatment TT 6 modified/TT 6A/6A modified (18 msw-13.5 msw) and (13.5 msw-9 msw)	.5 fpm	0.15 mpm (1.5 m/10 min)
Ascent rates	RCC Treatment TT 6A/6A modified (50 msw-18 msw)	30 fpm	6 mpm (32 m/5 min)
Ascent rates	RCC Treatment TT 6A DB (50 msw – 34 msw and 34 msw – 18 msw)		0.5 mpm (5 m/10 min)
Pressures	One atmosphere at sea level (rounded up from .987)	14.5 psi 32.6 fsw	1 bar 10 msw

Table 1 Conversion Chart

2. Reference documents that detail specific instructions for setting up equipment such as Diving Manuals, CFTO's and planned maintenance instructions will have both metric and imperial values listed. To standardize the instructions the figures provided by the original manufacturer will be listed first followed by the converted value.

When converting pressures only Barometric Pressure (BAR) will be used.

Definitions**Ascent and Descent rates:**

3. The time required to dive to the planned treatment depth is not as critical to the therapeutic effect of the treatment table as is the ascent rate, therefore descent rates are not to exceed 18 mpm except when using Treatment table 6A DB.

4. It is recommended that a rate meter be installed on chambers to provide the operator with a reasonable guide to achieving the required rate/depth.

5. Do not compensate for slower ascent rates; slow ascent will be dealt with as delays. Compensate for faster ascent rates by slowing/halting the ascent for the appropriate time period. Precise ascent rates (of 0.3 mpm and 0.15 mpm) are very difficult to achieve therefore supervisors should use discretion to achieve the target depth in the required time.

Decompression Instructions:

6. Chamber supervisors may be required to carry out decompression stops for locked in medical personnel or extra attendants. For Air dives up to 50 msw the supervisor will use B-GG-380-000/FP-002, B-GG-380-000/FP-003 metric tables and procedures. It is important to note that in all treatment tables, there are mandatory O₂ periods for the inside attendant.

7. Diving to 18 msw should be on O₂ but can be done on air based on patient condition and diving should not be delayed in order to confirm the patient on O₂.

Air Breaks:

8. Any patient treated with hyperbaric oxygen will require mandatory air breaks to prevent CNS O₂ toxicity. These air breaks are documented in the enclosed treatment tables. The usual duration of an air break is for 5 minutes, occurring after every 20 minute O₂/HeO₂ 50/50 period. Exceptions to this rule include travel from 50 to 18 msw, 18 to 9 msw and from 9 msw to the surface.

'Severe' Decompression Illness (DCI):

9. In this document the term 'DCI' is used to represent DCS or AGE or a combination of both.

10. Also, the term 'Severe' refers to symptoms or findings of DCI that require the utmost aggressive therapy. They represent the gravest and most worrisome end of the spectrum of serious / Type II presentations.

'Severe' DCI Findings:

11. Examples of 'severe' findings include:
 - e. Life-threatening symptoms (shock, no vital signs);
 - f. Paralysis of one or more limbs;
 - g. Unconsciousness or semi-comatose;
 - h. Loss of sphincter control;
 - i. Incapacitating vertigo; and
 - j. Acute abdominal or back pain.

12. Examples of findings that are NOT considered severe include:
 - a. Pain only.
 - b. Numbness/tingling.
 - c. Mild confusion or feeling unwell.
 - d. A CDM must be consulted in case of doubt regarding what symptoms/findings ought to be managed as 'SEVERE'.

Diving from surface with patients breathing Oxygen.

13. It is strongly recommended that the patient breathe oxygen from the surface to treatment depth. However, in some cases it is of greater benefit to reach treatment depth on air rather than oxygen.

Consultant in Diving and Hyperbaric Medicine (CDHM) or equivalent.

14. The CDHM resides at DRDC Toronto. Alternates include those with equivalent qualifications and are located at CFB Halifax and Esquimalt, and NDHQ Ottawa. This document refers to those with equivalent qualifications as 'Consultant in Diving Medicine (CDM)'.

CHAPTER 2

DIVING EMERGENCIES

REQUIRING RECOMPRESSION

SECTION 1

GENERAL

2101 Scope

1. This chapter does not cover every possible situation which may cause problems for a diver, nor will it serve as a text on first aid. B-GG-380-000/FP-001 of the CF Diving Manual Volume 1 covers diving physiology; B-GG-380-000/FP-002 Volume 2 provides information on first aid, resuscitation techniques, and control of bleeding.
2. This chapter specifically details the diagnosis of those emergencies which may require recompression treatment.

2102 Ancillary Treatment

1. Divers who require recompression may or may not require other emergency medical treatment. All Clearance Divers should be able to make this differentiation and should have sufficient knowledge and training to proceed with appropriate treatment or corrective action.
2. It may well be that no treatment would be the most appropriate course of action, especially by non-medical personnel; the first rule of first aid is to do nothing that will do harm to the patient. However, there are four first aid actions which cannot wait for the arrival of medical personnel. In order of priority, these actions are:
 - a. Assure clear airway.
 - b. Restore breathing.
 - c. Assure heart function.
 - d. Stop massive bleeding.
3. Following these four steps, a more thorough diagnosis of the problem can be made and the assistance of more qualified personnel obtained. From that point, the person helping a severely injured man will best serve him by protecting him from further harm, and by trying to maintain stable breathing, heart beat, and blood circulation. Recompression treatment may be concurrent with these procedures. See Article 3201.

2103 Emergencies Requiring Recompression

1. There are three general classes of diving medical emergency which require treatment by recompression:
 - a. Arterial Gas Embolism.

- b. Decompression Sickness.
- c. Omitted decompression.

2. Arterial Gas Embolism (A.G.E.) is the most dangerous of the three and must be treated as an extreme emergency. It can occur during a brief, shallow dive, even a dive made in a swimming pool with breathing equipment. It develops rapidly, and must be treated immediately.

3. Decompression sickness can be just as serious, but may develop quite gradually up to 24 hours after the completion of a seemingly routine and uneventful dive. However, statistics indicate that most cases will occur within 6 hours of surfacing.

4. Omitted decompression results from failing to observe the appropriate schedule of decompression, possibly as a result of serious injury to the diver in the water or an emergency at the dive station. In some cases decompression sickness may be prevented by utilizing one of the Surface Decompression Tables. Otherwise, a therapeutic treatment table must be followed.

2104 – 2199 not allocated

SECTION 2

OMITTED DECOMPRESSION AND ARTERIAL GAS EMBOLISM

2201 General

1. This section deals with two classes of diving emergency which usually require the fastest reaction on the part of the diving team.
2. Omitted decompression may range from minor to major decompression deficits. To take advantage of the Surface Decompression Tables the diver must be undressed and re-pressurized within the allowable surface interval.
3. Pulmonary Over-inflation syndrome (P.O.S.) is a general term used to describe the result of the expansion of gas which has been taken into the lungs while breathing under pressure and held in the lungs during a reduction in pressure, normally during ascent. The gas might have been retained in the lungs by choice (voluntary breath holding) or by accident (blocked air passages). The diver, reacting with panic to a difficult situation, may hold his breath without realizing that he is doing so. This is an involuntary reaction once the diver begins to panic. Gas can also be trapped in a portion of the lung as a result of damage from previous disease or accident, active infection (pneumonia, bronchitis), or asthma.
4. When the lungs are over-inflated and the alveoli rupture, the gas can go to four locations:
 - a. **Pneumothorax** - the gas goes to the potential space between the lung and the chest wall causing collapse of the individual lung.
 - b. **Mediastinal emphysema** - the gas travels along the veins, arteries and bronchioles from the site of rupture in the periphery of the lung to surround the heart, great vessels and root of the lungs in the centre of the chest (mediastinum).
 - c. **Subcutaneous emphysema** - the gas travels up from the mediastinum to lie under the skin in the area above the clavicles at the base of the neck.
 - d. **Arterial gas embolism (A.G.E.)** - the gas enters the capillaries surrounding the alveoli, travels back to the heart in the pulmonary veins, and is carried by the arterial blood throughout the body.
5. Pneumothorax, mediastinal, and subcutaneous emphysema are generally not as life threatening as arterial gas embolism but must still be dealt with swiftly. Recompression is not indicated for pneumothorax, mediastinal/subcutaneous emphysema and treatment should be at the discretion of an Advanced Diving Medical Officer.
6. In A.G.E. the gas bubbles in the blood may lodge in the arteries of the spinal cord or the brain, cutting off the circulation and thereby causing paralysis, unconsciousness, or death. If the brain is involved the term cerebral gas embolism may be used.

7. If gas in the lungs is not expelled, an ascent of only 1.2 msw can cause rupture of the alveoli. This is a more significant concern near the surface where expansion of the gas is greatest. Symptoms of A.G.E, will normally be evident within minutes of surfacing. Speedy diagnosis and recompression are essential if permanent injury or death is to be avoided.

2202 Omitted decompression

1. Certain emergencies may interrupt or prevent planned decompression. Blow-up, exhausted air supply, and bodily injury constitute such emergencies. If the diver shows any symptoms of decompression sickness or gas embolism, immediate treatment using the appropriate oxygen treatment table is essential. Even if the diver shows no symptoms or ill effects, omitted decompression must be treated by recompression to reduce the risk of DCS.

2. Omitted decompression may range from minor to major decompression deficits. For the purposes of CF Decompression Tables omitted decompression is defined as the time omitted from in-water decompression, calculated from the appropriate CF Decompression Table.

3. The preferred action is to get the diver to a Recompression Chamber Complex (RCC) for treatment. The diver should receive 100% oxygen by double seal oral nasal mask while on route to the RCC. As a last resort when transit to an RCC is not feasible, the dive supervisor has the following options:

- a. Return the diver to a depth one stop deeper than where the omission occurred and repeat this stop. Continue Decompression IAW the original schedule, or
- b. If the omission occurred at the first stop, return the diver to a depth one stop deeper and remain there for the scheduled time of the first stop. Continue Decompression IAW the original schedule.

4. Omitted decompression should be managed as follows in the RCC:

- a. If the 9 msw stop was completed with no previous decompression omitted, recompress the diver in the RCC on oxygen to 12 msw and decompress (IAW the appropriate surface decompression Sur - D table).
- b. Use TT 5 for **ASYMPTOMATIC** individuals, if the in-water omitted decompression is less than 30 minutes and/or the planned RCC time is less than 30 minutes.
- c. Use TT 6 for **ASYMPTOMATIC** individuals, with 30 min or more of in water omitted decompression time and/or planned RCC time of 30 min or more.
- d. Use TT 6 for **SYMPTOMATIC** individuals, with Omitted decompression.
- e. For **SEVERE** symptoms/findings that persist despite aggressive treatment using conventional treatment tables. TT 6A DB may be used as an extreme measure. It shall be used only on advice of a CDM.
- f. While conducting a Sur - D, if for any reason the Sur - D procedure cannot be completed the diver must be treated using a TT 6 and:
- g. If a diver omits decompression and violates the seven minute surface interval, treat on TT6.

2203 Arterial Gas Embolism (A.G.E.)

1. Arterial gas embolism must be diagnosed quickly and correctly. The supply of blood to the brain is almost always involved and unless promptly and properly treated (by recompression), gas embolism is likely to result in permanent disability or death. The circulation time from the heart to the brain is only a few seconds and neurological symptoms such as unconsciousness will normally occur within a few minutes of reaching the surface. Any central nervous system (CNS) symptoms which develops more than ten minutes after surfacing is rarely the result of gas embolism. CNS symptoms are described in Article 2305.
2. Any diver who may have obtained a breath from any source at depth and who loses consciousness or exhibits any neurological symptoms within ten minutes after reaching the surface must be assumed to be suffering from arterial gas embolism. Recompression treatment must be started immediately.
3. Other factors to consider in diagnosing arterial gas embolism are:
 - a. The onset is usually sudden and dramatic, often occurring within seconds after arrival on the surface or even before reaching the surface. The signs and symptoms may include: bloody, frothy sputum, dizziness, paralysis, weakness, respiratory failure, disturbance of vision, or convulsions. The diver may have noticed chest pain or a sensation like a blow to the chest during ascent. It is common for the first symptom to be convulsion or loss of consciousness.
 - b. Some of these symptoms may also be experienced by a diver suffering from decompression sickness but the time of onset is normally later. If the dive has been to a depth of less than 9 msw, decompression sickness is unlikely and arterial gas embolism must be assumed. If the only symptom is pain, A.G.E. is unlikely and decompression sickness or one of the other conditions which results from POS should be assumed. The dive profile will usually provide clues to the correct diagnosis (e.g., uncontrolled or rapid ascent).
 - c. Some symptoms may be masked by environmental factors or by other, less significant, symptoms. A diver who is chilled may not be concerned with numbness in an arm. Pain from any source may divert attention from other symptoms. The natural anxiety that would accompany failure of air supply might mask a state of confusion which is being caused by A.G.E. affecting the brain. A diver who is coughing up blood or bloody froth may be showing signs of ruptured lung tissue, or he may merely have bitten his tongue.
4. Ambiguities of this sort will usually be quickly resolved by the appearance of more severe symptoms, however, once the diver is in the hyperbaric chamber it may be difficult to evaluate the symptoms.
5. Arterial gas embolism may be accompanied by pneumothorax, mediastinal and /or subcutaneous emphysema. Therefore, a very careful neurological examination must always be performed and if there are any neurological signs or symptoms, immediate treatment for A.G.E. must be initiated.

6. Severe AGE symptoms include:
 - a. Life-threatening findings such as shock or no vital signs,
 - b. Unconsciousness or semi-comatose,
 - c. Incapacitating vertigo.

2204 Pneumothorax

1. Pneumothorax can be accompanied by chest pain and/or coughing up of blood or bloody froth. Shallow rapid breathing, increased pulse rate, cyanosis, and/or subcutaneous emphysema may also be present. The pneumothorax may be detected by listening to both sides of the chest. Chamber venting and other noises will need to be suppressed to do this effectively. Breath sounds will be decreased or inaudible over the side where a significant pneumothorax exists.

2205 Mediastinal Emphysema

1. The symptoms of mediastinal emphysema may include discomfort or pain under the breastbone, shortness of breath, and faintness. These latter two would be the result of the trapped gas pressing against the lungs, heart and large blood vessels thereby interfering with breathing and/or circulation. This might also be evidenced by blueness (cyanosis) of the skin, lips or fingernails.

2206 Subcutaneous Emphysema

1. Subcutaneous Emphysema may not be noticed by the victim except in extreme cases, although he might experience a feeling of fullness around the neck and have difficulty in swallowing. The sound of his voice may change and an observer may note a marked swelling or inflation of the neck. Movement of the skin near the collar bone may produce a crackling or crunching sound (crepitation).

2207 - 2299 not allocated

SECTION 3

DECOMPRESSION SICKNESS

2301 Decompression Sickness

1. Decompression Sickness (DCS) is caused by inadequate decompression.
2. Occasionally, DCS occurs when normal decompression procedures are followed. Certain factors increase the likelihood of DCS, even when following standard procedures. This must be taken into account by increasing decompression time where necessary or by avoiding the predisposing factor.

2302 Predisposing Factors for Decompression Sickness

1. The likelihood of DCS occurring increases when one or more of the following factors are involved:
 - a. Injury (sites may develop DCS more easily).
 - b. Obesity.
 - c. Hangover (after alcohol consumption).
 - d. Age (risk increases with age, especially over 40).
 - e. Strenuous physical exercise (before, during, or after diving).
 - f. Dehydration from any cause (e.g. hangover).
 - g. Poor physical fitness.
 - h. Cold (especially during decompression).
 - i. Mental stress (unfamiliarity with diving, fear, anxiety).
 - j. Fatigue.
 - k. Infection.
2. Whenever possible the complete history of the dive and any predisposing factors should be taken into account when diagnosing DCS.

2303 Diagnosis of Decompression Sickness

1. Decompression sickness usually causes symptoms within a short time following the dive or exposure to pressure. If the required decompression has been severely shortened or completely omitted, the diver could suffer decompression sickness before he reaches the surface. In general, the time of occurrence after surfacing for the onset of the first symptom is as follows:
 - a. 70% occur within 1 hour.
 - b. 90% occur within 6 hours.
 - c. 99% occur within 24 hours.

2. When the first symptom occurs more than 24 hours following a dive it is probably not caused by decompression sickness but if not sure a trial of pressure or treatment can be started.
3. Factors to be considered in evaluating symptoms include the depth and duration of the dive, the decompression table used, the stress of the dive (e.g. cold, hard work) and the probability of other conditions such as gas embolism. The best qualified person available should make a presumptive diagnosis. This must not be delayed while awaiting the arrival of a better qualified person.
4. A wide range of symptoms may signal the onset of decompression sickness and some will be so obvious that the diagnosis will not be in doubt. Subtle symptoms may not be detected if a complete examination of the patient is not performed.
5. Symptoms of decompression sickness among professional divers have been found to occur with approximately the following frequency:
 - a. Pain only 80%. Pain is a symptom in over 90% of all cases.
 - b. Neurologic: 15%
 - c. Vestibular: less than 1%
 - d. Pulmonary (chokes): less than 1%
 - e. Other: 3-5%
 - f. Fatigue: A common symptom in most cases of DCS.
6. Eighty percent of recreational divers with decompression sickness who are treated at a hyperbaric chamber have neurologic symptoms. The reason that pain as the only symptom is less commonly reported among recreational divers is probably because many sport divers with pain do not seek hyperbaric treatment.

2304 Decompression Sickness - Type I DCS (Mild)

1. Pain is the most common symptom of decompression sickness in professional divers. The pain is usually slight when first noticed, but may grow progressively worse until it becomes unbearable. It may seem to come from deep in a bone and will often be near a joint. It is easy to misinterpret pain as being due to a sprain or a bruise. Pain should not be treated with drugs in an effort to make the patient more comfortable because it is often the only way to measure the effectiveness of the treatment.
2. Abdominal or back pain may signal involvement of the spinal cord and therefore should be regarded as a Type II DCS (serious) symptom. The diver should be carefully examined for other signs or symptoms of DCS and treated accordingly. A diver with abdominal pain after a dive should be carefully observed for the development of decompression sickness for at least several hours after surfacing.
3. "Niggles" or short duration aches and pains may be signs of decompression stress, but if there is any doubt as to the origin of the pain, assume that the diver is suffering from decompression sickness and treat accordingly.

4. Lymphatic DCS results from blockage of the lymphatic ducts by bubbles. The additional build-up of fluid in the tissue causes localized swelling and oedema. If a chamber is readily available, treatment should be instituted. If a chamber is not readily available, lymphatic bends will usually resolve over several days without treatment.
5. Skin bends refers to decompression sickness caused by blockage of the circulation in the skin by bubbles. It presents as a swollen, red or mottled, tender area of skin. If a chamber is readily available, treatment should be instituted. If a chamber is not readily available, skin bends will usually resolve over several days without treatment.
6. Other skin symptoms that are frequently observed after a dive include a painless rash, itching, and prickling. These symptoms are usually due to gas dissolving directly into the skin and therefore occur after dives in which the skin is exposed to gas (chamber, dry suit) and not after wet suit or hot water suit dives. This is not decompression sickness and does not require treatment.
7. Symptoms of localized pain, oedema and/or an area of tender, red or mottled, raised skin are Type I DCS (Mild), decompression sickness. They should be treated with the appropriate oxygen treatment table.

2305 Decompression Sickness - Type II DCS (Serious)

1. Central nervous system (CNS) and/or spinal cord involvement is a serious problem requiring prompt treatment. In severe cases immediate recompression is essential.
2. Symptoms of Type II DCS serious include:
 - a. Numbness;
 - b. Dizziness or vertigo;
 - c. Nausea or vomiting;
 - d. Visual disturbance;
 - e. Headache (acute);
 - f. Urinary disturbance;
 - g. Shortness of breath;
 - h. Personality change;
 - i. Agitation or restlessness;
 - j. Fatigue (acute);
 - k. Muscular twitching;
 - l. Confusion;
 - m. Lack of coordination; and
 - n. Balance problems.

3. Severe manifestations of Type II (Serious) DCS include:
 - a. Life-threatening findings (shock, no vital signs),
 - b. Paralysis of one or more limbs,
 - c. Unconsciousness or semi-comatose,
 - d. Loss of sphincter control,
 - e. Incapacitating vertigo,
 - f. Acute abdominal or back pain.
4. It should be noted that not all Type II (Serious) findings are “Severe” - but on the other hand, all “Severe” findings are regarded as Type II (Serious).
5. A short delay is acceptable, to allow surface examination by diving medical personnel, preferably an Advanced Diving Medical Officer.
6. The examination may be completed in the chamber at treatment pressure; however, at greater depths this will prove difficult owing to noise, heat, and narcosis.
7. Many of these symptoms are overlooked, or passed off by the victims as being of no consequence. For this reason, they must be watched during the immediate post-dive activities of the diver, who may just think he has been working too hard.
8. One point must always be kept in mind: **IF THERE IS ANY DOUBT, RECOMPRESS AND TREAT ACCORDING TO THE FLOWCHART.**

2306 Rapid Neurological Examinations

1. All divers responsible for supervising hyperbaric treatments should be able to perform a rapid assessment of neurologically related symptoms. The diagnosis of DCS may depend upon the detection of subtle or deceptive signs.
2. A quick check may be performed with adequate thoroughness by following the aide-memoire at figure 2-3-1.
3. A detailed examination, performed by qualified personnel, may be conducted in accordance with Form 5 of the Diving Incident/Accident Report contained in Volume 2 of CF Diving Manual.

2307-2399 not allocated

RAPID NEUROLOGICAL EXAMINATION

Patient's Name: _____ Place: _____ Date: _____ Time: _____

Normal Abnormal HEAD AND NECK

- ----- Orientation (time, person. Place)
- ----- Visual Acuity (count fingers; ask about double vision)
- ----- Visual Fields (bring fingers from behind patients head)
- ----- Pupils equal and reactive to light
- ----- Eye movement ("H" pattern; nystagmus)
- ----- Sensation of forehead, checks, lower jaw
- ----- Clench teeth (check jaw muscles)
- ----- Furrow brow
- ----- Smile or grimace
- ----- Shut eyes tight (check muscles above and below eyes)
- ----- Check hearing / noises
- ----- Swallow
- ----- Shrug shoulders (apply force both shoulders; check resistance)
- ----- Protrude tongue (check for deviation to one side)

SENSATION

- ----- Ask if any unusual sensation
- ----- Check sensation of arms, trunk, back, legs
- ----- Ask if the sensation is the same on both sides

MOTOR FUNCTIONS

- ----- Finger squeezes bilaterally
- ----- Thumbs down, resist pushing arms together
- ----- Thumbs up, resist pushing arms apart
- ----- Check flexion and extension of the hip, knee and ankle
- ----- Plantar Reflex (toes down = normal)

Add explanatory note for all abnormalities.

Figure 2-3-1 Rapid Neurological Examination Checklist
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CHAPTER 3
RECOMPRESSION TREATMENT
AND TABLES

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CHAPTER 3

RECOMPRESSION TREATMENT AND TABLES

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CHAPTER 3

RECOMPRESSION TREATMENT

SECTION 1

GENERAL

3101 Treatment of Decompression Sickness

1. The first symptom of decompression sickness will usually occur within 6 hours of exposure to pressure, but may be delayed up to 24 hours or even longer. In all cases where signs or symptoms of possible DCS occur within 24 hours of a pressure exposure, DCS must be presumed and the patient treated as quickly as safely possible. Recompression while breathing 100% Oxygen will reduce the size of any bubbles, increase oxygen delivery to compromised tissues, and create a steep inert gas gradient to improve off-gassing. The signs and symptoms are usually quickly relieved by this treatment. Additional recompression treatments and adjunctive therapy may be necessary.

2. In all cases involving recompression treatment the Diving Officer/Chamber Supervisor is responsible for the safe operation of the chamber. The Diving Officer/Chamber Supervisor shall initiate treatment and turn it over to an Advanced Diving Medical Officer as soon as possible in accordance with Article 1206.

3. Certain facets of recompression treatment have been previously mentioned, but are so important that they warrant repeating:

- a. Treat promptly and adequately.
- b. Do not delay treatment for the arrival of medical personnel.
- c. The effectiveness of treatment decreases with the length of time between the onset of symptoms and the treatment.
- d. If no differentiation can be made between serious decompression sickness and arterial gas embolism, refer to the Decompression Illness flow chart and follow instructions.
- e. Do not ignore seemingly minor symptoms; they can quickly become major.
- f. Follow the selected treatment table accurately and completely.
- g. The post-treatment restrictions in Article 3213 must be closely followed.

3102 - 3199 not allocated

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SECTION 2

RECOMPRESSION TREATMENT

3201 Diving Accident Response

1. When an accident occurs several immediate actions must be taken. These may be briefly summarized as:

- a. Recover victim from water.
- b. Position victim correctly.
- c. Assess vital signs; perform BLS/CPR as indicated.
- d. Treat major external injuries (first aid).
- e. Provide 100% oxygen.
- f. Keep warm and comfortable.
- g. Examine (if time/severity permits).
- h. Recompress or transport to chamber.
- i. Secure equipment for investigation.

2. Some or all of these actions may be required depending upon the situation. The remainder of this section deals with the foregoing in more detail. (See Article 2102)

3202 Immediate Emergency Care

1. **First Aid.** The first phase in the treatment is immediate emergency care. Get the victim on board ship or to shore if he/she is still in the water, unless the incident occurs under pressure. Make sure that heart action and respirations are adequate, and if not, start artificial respiration and/or cardiopulmonary resuscitation as required. Treat any major external injury with appropriate first aid.

2. **Position.** If the case is minor, have the victim placed in a comfortable position or lying down; keep him warm and give him fluids to drink. If the case is serious, keep the patients lying down on his side. This will aid blood supply to the brain and reduce the likelihood of aspiration if the patient vomits. The head-down position should not be used as it results in cerebral swelling and worse outcome than the horizontal position.

3. **Fluids.** Keep the patient warm and give fluids intravenously and/or by mouth. Give nothing by mouth if the patient is nauseated. An intravenous (IV) should be started in all cases of DCI.

4. **Oxygen.** All cases of DCI should be administered 100% oxygen by a well-sealed facemask or mouthpiece/nose clip during transportation to the chamber.

5. If an oxygen mask is unavailable, any suitable oxygen apparatus may be used. No air breaks are required unless transport exceeds 24 hours.

6. **Transportation.** If a hyperbaric treatment facility is immediately available, recompress the patient in the chamber on the appropriate table. If a facility is not immediately available, the patient must be transported to the nearest facility as rapidly as possible. During transportation continue the measures outlined above. See Article 3203 on Transportation.

7. If the case is extremely serious (i.e. transportation of the patient is not recommended) and no facility is immediately available, arrange to have a mobile or portable chamber brought to the patient to initiate treatment. A patient whose treatment commences in a portable chamber should be transferred under pressure (TUP) into a two-lock chamber as soon as possible.

8. With respect to a case of decompression sickness occurring under pressure, the following should be noted. Such cases are most likely to occur in a hyperbaric chamber during experimental diving. In operational diving, it is expected that all measures will be in effect to prevent decompression sickness from occurring. Therefore, a case of decompression sickness under pressure should rarely occur. If symptoms of DCS occur before the Sur - D in-water stops have been completed, continue decompression if at all possible until the surface interval. At that time, the symptomatic diver should be surfaced and treated on appropriate table (see article 2202). If the nature of the operation is such that the risk of decompression sickness is significant, a hyperbaric chamber should be at the diving site.

3203 Transportation

1. If a hyperbaric treatment facility is not immediately available, the patient must be transported to the nearest facility. The mode of transportation must be the most rapid immediately available, whether boat, road vehicle, or aircraft. If unpressurized air transport is used, the aircraft must remain as low as possible, consistent with flight safety, to prevent worsening of the decompression illness by further decompression to altitude. If possible, altitudes below 300 metres should be maintained. If a pressurized aircraft is used, the cabin must be maintained at as high a pressure as possible, sea level (or even BEYOND sea level) pressure is preferred.

2. If the patient must be transported, the initial arrangements should have been made well in advance of the actual diving operation in accordance with Chapter 5 of Volumes 2 and 3 of the CF Diving Manual. These arrangements would include an "alert" notification to the hyperbaric treatment facility and a determination of the most effective means of transportation.

3. During transportation, call ahead to ensure that the hyperbaric chamber will be ready and that qualified medical personnel will be standing by. If communications can be established, obtain consultation with the Advanced Diving medical Officer at the chamber while in transit.

4. The supervisor who started the treatment must stay with the patient throughout transportation, until the patient is placed in a treatment chamber. This applies whether or not the patient is transported in a portable chamber.

5. The Diving Incident/Accident Reports shall be completed as fully as is practical, and shall accompany the patient in transit. The history of the incident should be obtained from the patient, his/her dive partner, and personnel involved at the dive site or area.

6. During transportation the appropriate Immediate Care actions in Article 3202 must be followed. If fluids are given, this should be recorded. The patient must be carefully watched for urinary retention, which may occur in neurological decompression illness. This may necessitate catheterization and may sometimes be the first evidence of neurological involvement. The patient's condition must be constantly monitored for other symptoms or difficulties, including airway, breathing circulation, pulse, and bleeding.
7. Fluids must be administered to correct the dehydration which occurs in all serious cases of decompression sickness. Intravenous fluids are preferred; however, one to two litres of clear, non-alcoholic fluids taken orally during transportation will be helpful.
8. Intravenous fluids should be normal saline only and Ringer's if unavailable. The first litre should be given rapidly; urine output should be monitored and maintained at 60 to 100 cc/hour.
9. An Advanced Diving Medical Officer may use other ancillary drugs or adjunctive therapies in accordance with current guidelines. A complete record of any drugs administered must be kept with the patient. Note that painkilling drugs should be avoided as they may mask symptoms.
10. If the patient is unconscious, DO NOT PUT HIM ON HIS BACK; he must be on his side or face down and he must have an adequate airway to breathe.
11. Assisted ventilation, with or without endotracheal intubation, may be required in severe cases. Oxygen should be provided in accordance with Article 3202.
12. Nasogastric intubation may be required.

3204 Recompression Treatment

1. The third phase in the treatment of decompression sickness is the definitive treatment of returning the patient to pressure on 100% oxygen. The pressure exposure is conducted in accordance with the prescribed Treatment Tables in this chapter. Any of the preceding ancillary measures may be used in conjunction with recompression, and if started, should be continued during recompression. Special notes on the use of the Recompression Treatment Tables accompany the Tables in the Annexes to this chapter.
2. Modifications to Standard Tables or selection of Alternate Tables shall be in accordance with Article 1302 and 3216.

3205 Oxygen Treatment Tables and CNS Oxygen Toxicity

1. Extensive research and field experience has shown the therapeutic value of breathing oxygen during recompression treatment. The Standard Oxygen Treatment Tables 5, 6, 6 Modified, 6A, and 6A Modified are shown, with instructions for their use, in Annex 3A.
2. The tender must be alert for symptoms of CNS oxygen toxicity, such as:
 - a. Changes in vision such as blurring or narrowing of the visual field.
 - b. Ringing in the ears.
 - c. Nausea/vomiting.
 - d. Twitching of the face and lips.

- e. Tremors of the arms and legs.
- f. Restlessness and irritability.
- g. Anxiety.
- h. Dizziness/vertigo.
- i. Confusion.
- j. Malaise or excessive tiredness.
- k. Incoordination.
- l. Numbness or tingling of the fingers or toes.
- m. Fainting.
- n. Spasmodic breathing.
- o. Difficulty in taking a full breath, or apparent resistance to breathing.
- p. Seizure/Convulsions.

3. A useful acronym to assist the diver in remembering these symptoms is VENTID: Vision, Ears, Nausea, Twitching, Irritability, and Dizziness.

3206 Treatment of CNS Oxygen Toxicity

1. The procedure for treating oxygen toxicity involves immediate reduction in oxygen partial pressure and protection of the diver from physical injury if he begins to convulse. Specifically:
 - a. Remove mask at once.
 - b. Maintain depth.
 - c. Protect the convulsing patient from injury but do not forcefully oppose the convulsive movements.
2. When convulsions cease, position the unconscious patient on his side to ensure a clear airway until consciousness returns.
3. Should a seizure occur at 18 msw, stop the chamber, discontinue oxygen breathing. When the convulsion has stopped and the patient is breathing normally, the chamber will be brought up to 9 msw at 9 mpm on air; the supervisor must consider slower ascent rates and possible delays. At 9 msw after the symptoms have resolved, wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw.
4. If oxygen breathing must be interrupted due to CNS O₂ toxicity (VENTID), discontinue oxygen breathing, allow for symptoms to subside, wait an additional 15 minutes and resume the treatment table breathing oxygen from the point of interruption.

5. If a second toxic reaction occurs deeper than 9 msw, stop the chamber, discontinue oxygen breathing. When patient is relaxed and breathing normally, travel to 9 msw at 9 mpm on air (supervisor can consider slower ascent rate). At 9 msw after symptoms have resolved, wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw.
6. If CNS O₂ toxicity occurs a third time, consideration should be made to terminating or modifying the treatment table. If treatment table is continued, wait at least 15 min after symptoms has resolved and resume the treatment table breathing oxygen from the point of interruption. If the treatment table is terminated, the inside attendant's decompression requirements must be considered. After termination or completion of a treatment table, the patient must normally breathe a minimum of 6 hours of air on the surface, prior to commencing a second treatment, unless symptoms or clinical situation dictate otherwise.
7. **Situations absolutely requiring interruption of oxygen are a convulsion or refusal of the patient to breathe oxygen.** All other signs of possible oxygen toxicity should be considered warning signs.
8. Alternate hyperbaric treatment tables such as HBO tables 2.0 or 2.4 ATA, may be prescribed by an ADMO.

3207 Recurrence of Signs and Symptoms of DCS

1. If a serious symptom recurs during an oxygen treatment at 18 msw or less, recompress to 18 msw and follow Treatment Table 6 modified. (See figure 3-2-3 Recurrence during Treatment flow chart). If a serious symptom recurs deeper than 18 msw, travel must still continue to 18 msw. Deviation from this must be ordered by a CDM (See figure 3-2-3 Recurrence during Treatment flow chart).
2. If a symptom recurs following treatment, recompress the patient to 18 msw on oxygen and treat with appropriate Treatment Table (see figure 3-2-4 Recurrence after Treatment). Trial of Pressure shall never be used for a recurrence.
3. Always re-examine the patient carefully at the start of treatment and during treatment as outlined in Articles 2306 and 3210.
4. Always consider the use of medical treatment in addition to recompression and oxygen.
5. Following completion of a treatment table which has failed to provide complete relief, provide a surface interval (normally minimum of 6 hours) to allow complete medical evaluation and rest. Additional treatments will be required.
6. Any symptom that occurs within 7 days after a treatment for DCI must be regarded as a possible recurrence. (See figure 3-2-4 Recurrence after Treatment)
7. In all cases of possible recurrence, a CDM shall be consulted and decision not to re-treat shall only be made by a CDM or equivalent.

3208 Errors Related to Hyperbaric Treatment

1. It is essential to guard against the following errors:
 - a. Failure of the diver to report symptoms early.
 - b. Failure to treat doubtful cases.
 - c. Failure to treat promptly.
 - d. Failure to treat adequately.
 - e. Failure to recognise serious symptoms.
 - f. Failure to keep the patient near the chamber after treatment.
 - g. Failure to recognise recurrence.

3209 General Rules and Guidelines for Hyperbaric Treatment

1. In administering recompression treatment using any Table, the rules in Figure 3-2-1 must be adhered to in order to avoid danger to the patient and attending personnel.
2. Recompression deeper than 50 msw shall not be attempted except upon the direction of a Consultant in Diving Medicine (CDM) since specialized decompression procedures will be required.
3. During decompression the patient should be closely observed for a recurrence of symptoms which may necessitate immediate re-pressurization in accordance with Article 3207.
4. The recompression treatment decision assisting flow charts shown in Figures 3-2-2, 3-2-3, and 3-2-4 have been developed to simplify administration of proper treatment. Figures 3-2-3 and 3-2-4 are particularly helpful in situations in which a recurrence of symptoms occurs.
5. Figure 3-2-5 lists the Recompression Treatment Tables available and their use.
6. For any depth below 18 msw, the preferred breathing gas is 50/50 HeO₂, resulting in a higher partial pressure of O₂ (3.0 ATA at 50 msw).

3210 Examination of the Patient

1. If diving medical personnel are available and there are no serious symptoms, the patient should normally be examined before pressurization. If no diving medical personnel are available, the patient is to be neurologically examined in accordance with Article 2306 and treated in the chamber without further delay. Serious symptoms demand immediate pressurization of the patient. Examination under pressure, while not ideal, is preferable to increasing the risk of permanent injury by delaying the treatment for the arrival of diving medical personnel.
2. If examination in the chamber is not possible (e.g. in a transportable chamber) examine the patient prior to recompression and carefully note all signs and symptoms.
3. Upon reaching the treatment depth, examine the patient as completely as possible to detect evidence of incomplete relief or to detect signs and symptoms which may have been overlooked. If possible have the patient stand up, and walk the length of the chamber.

4. The patient should be completely re-examined before leaving the initial treatment depth.
5. Throughout the treatment, periodically examine the patient.
6. Do not let the patient sleep during the ascent phases of treatment.
7. The patient should be completely re-examined before leaving the last stop.

3211 Attendants

1. An attendant (see figure 1-2-1 Table of Authorized Chamber Operating and Supervisory Limits) must be in the chamber with the patient at all times. A diving medical technician is the preferred attendant during all recompression treatments. See Article 1301.
2. The attendant must be alert for any changes in the condition of the patient, especially signs and symptoms of oxygen toxicity.
3. The attendant should remain with the patient throughout the entire treatment schedule. If an attendant comes out of the chamber then he must be decompressed according to the appropriate decompression schedule, and they must adhere to the flying after diving regulations (See Article 1303).
4. Anyone entering or leaving the chamber during the treatment must have his depth and bottom time recorded and decompressed appropriately.
5. The person on the surface responsible for the treatment has final authority over all decisions/recommendations made by personnel in the chamber.
6. During oxygen treatment tables, the Attendant will breathe oxygen in accordance with Article 1301.
7. The attendant should remain with the patient throughout the entire treatment schedule. If an attendant comes out of the chamber then he must be decompressed according to the appropriate decompression schedule, and they must adhere to the flying after diving regulations (See Article 1303).

3212 Treatment of Omitted Decompression

1. Treatment of omitted decompression will be in accordance with Article 2202.

3213 Restrictions after Recompression Treatment

1. Upon completion of recompression treatment there are a number of restrictions which must be placed on the patient, based upon the severity of the case, the degree of recovery, and the risk of recurrence. The following restrictions are considered to be the minimum acceptable and apply in all cases.
 - a. **After Surfacing.** The patient should be kept under observation for one hour and then re-examined for residual symptoms. During the 24 hour period following any treatment the patient must remain within one hour's travel time of the chamber. These restrictions do not apply to a diver who has been treated for asymptomatic omitted decompression.

- b. **Type I DCS (mild).** If the symptoms are completely resolved, the patient is unfit flying for 3 days and unfit for diving for 7 days following the treatment. The diver must be cleared by an ADMO prior to returning to fit for diving status. Findings are to be annotated on member's medical file and diver's log, as required.
 - c. **Type II DCS (serious).** If the symptoms are completely resolved on one treatment table, the patient is unfit flying for 7 days and unfit diving for 30 days following treatment. If there were residual symptoms or repeated treatments were required, the patient is unfit flying for 10 days and unfit diving until the case has been reviewed by CDM and a decision made on the patient's fitness to dive. Findings are to be annotated on member's medical file and diver's log, as required.
 - d. **A.G.E.** If the symptoms are completely resolved on one treatment table, the patient is unfit flying for 7 days following treatment. If 2 or more treatment tables were required, the patient is unfit flying for 10 days following treatment. In all cases the patient is unfit diving until the case has been reviewed by CDM and a decision made on the patient's fitness to dive. Findings are to be annotated on member's medical file and diver's log, as required.
2. These restrictions may only be modified after consultation with a CDM.

3214 Medical Consultation

1. Any Consultant in Diving Medicine (CDM) may be consulted on diving medical problems.
2. Additional diving medical contacts are shown on page i of this volume.
3. All accidents or diving incidents requiring recompression treatment shall be managed in consultation with a CDM. The requirement to consult a CDM does not prohibit the initiation of treatment but rather directs that a consultation via telephone shall occur at the earliest practical opportunity.

3215 Hyperbaric Treatment of Ailments Unrelated to Diving

1. A variety of medical disorders which are not related to diving respond to hyperbaric oxygen therapy. These include:
 - a. Air or gas embolism - may be secondary to surgery or other invasive medical procedures;
 - b. Carbon Monoxide Poisoning and Smoke Inhalation;
 - c. Clostridial Myonecrosis (gas gangrene);
 - d. Crush injury, Compartment Syndrome, and other Acute Traumatic Ischemia;
 - e. Enhancement of healing in selected problem wounds (including Central Retinal Arterial Occlusion);
 - f. Exceptional blood loss anaemia;
 - g. Necrotizing Soft Tissue Infections (subcutaneous tissue, muscle, fascia);
 - h. Osteomyelitis (refractory);
 - i. Radiation Tissue Damage (ostioradionecrosis);

- j. Skin Grafts and Flaps (compromised); and
- k. Thermal Burns. (severe).

2. When treating the above or other non-diving ailments, a physician must be in attendance and the treatment schedule shall proceed in accordance with his directions. This requirement does not relieve the Diving Officer/Chamber Supervisor of their responsibility for overseeing the correct operation of the chamber and the general safety of the occupants. The Diving Officer/Chamber Supervisor should advise the physician if he is concerned about any aspect of the treatment. See Article 1304.

3216 Alternate Treatment Tables

1. An ADMO may prescribe:
 - a. Extensions to treatment tables at 18 msw or shallower within maximum delays specified;
 - b. Additional trials of O₂ after O₂ toxicity seizures or other symptoms, before travelling; and
 - c. HBO tables shallower than 18 msw.
2. Only a CDM or equivalent may prescribe other changes, Alternate Treatment tables as shown at Annex 3B, or other non-standard treatment tables.

3217 Trial of Pressure

1. After surfacing from a dive, a diver will often experience symptoms that are not clearly due to decompression sickness. If there is any possibility that the symptoms may be DCS the diver must be evaluated and the only effective evaluation is recompression on 100% oxygen.
2. Any trial of pressure must normally take place in consultation with an ADMO and CDM.
3. The diver is placed on 100% oxygen, dived to 18 msw and given two 20 minute oxygen periods. If there has been absolutely no change in symptoms, the patient is unlikely to have DCS, and the chamber can be surfaced at 18 msw/min. If any doubt remains complete a TT5. Any change in symptoms on descent, during O₂ period at depth, or during ascent, return to 18 msw and initiate TT6. Supervisor must consider decompression requirements if trial of pressure exceeds 50 min bottom time.
4. If a new symptom is noted after a trial of pressure, TT6 should be started. A trial of pressure has no effect upon a diver's repetitive factor.

3218 Guidelines for return to fit for diving status

1. See Art 3213

3219 – 3299 not allocated

Rules for Recompression Treatment	
Always:	<ol style="list-style-type: none">1. Follow the Treatment Tables accurately.2. Have a qualified attendant in chamber during recompression.3. Maintain the normal descent and ascent rates.4. Examine patient thoroughly at depth of relief or treatment depth.5. Treat an unconscious patient for gas embolism or serious decompression sickness unless the possibility of such a condition can be ruled out without question.6. Use Oxygen Treatment Tables.7. Be alert for signs and symptoms of oxygen toxicity.8. In the event of oxygen convulsion, remove the oxygen mask and keep the patient from harming themselves.9. Maintain oxygen usage within the time and depth limitations.10. Check patient's condition periodically during treatment.11. Observe the restrictions after recompression treatment (Article 3213)12. Maintain accurate timekeeping and recording.13. Maintain medical kit as required by Annex 5A.
Never:	<ol style="list-style-type: none">14. Permit any alteration to the tables except as directed by an ADMO or CDM IAW article 3216.15. Let patient sleep during depth changes.16. Wait for a bag resuscitator. Immediately use mouth-to-mouth resuscitation if breathing ceases.17. Break rhythm during resuscitation.18. Permit the use of 100% oxygen below 18 msw.19. Fail to treat doubtful cases.20. Fail to report symptoms early (diver).21. Allow personnel in the chamber to cross legs or assume a cramped position which may interfere with blood circulation.

Figure 3-2-1 Rules for Recompression Treatment

FLOWCHARTS

This section contains a series of flowcharts designed to assist the Recompression Chamber Team with guidance towards making decisions before during and after a treatment. Included are:

FIGURE	TITLE	PAGE
3-2-2	Decompression Illness	3-2-12
3-2-3	Recurrence of symptoms during treatment - Summary	3-2-13
3-2-4	Recurrence after treatment - Summary	3-2-14
3-2-5	Recompression treatment table use	3-2-15

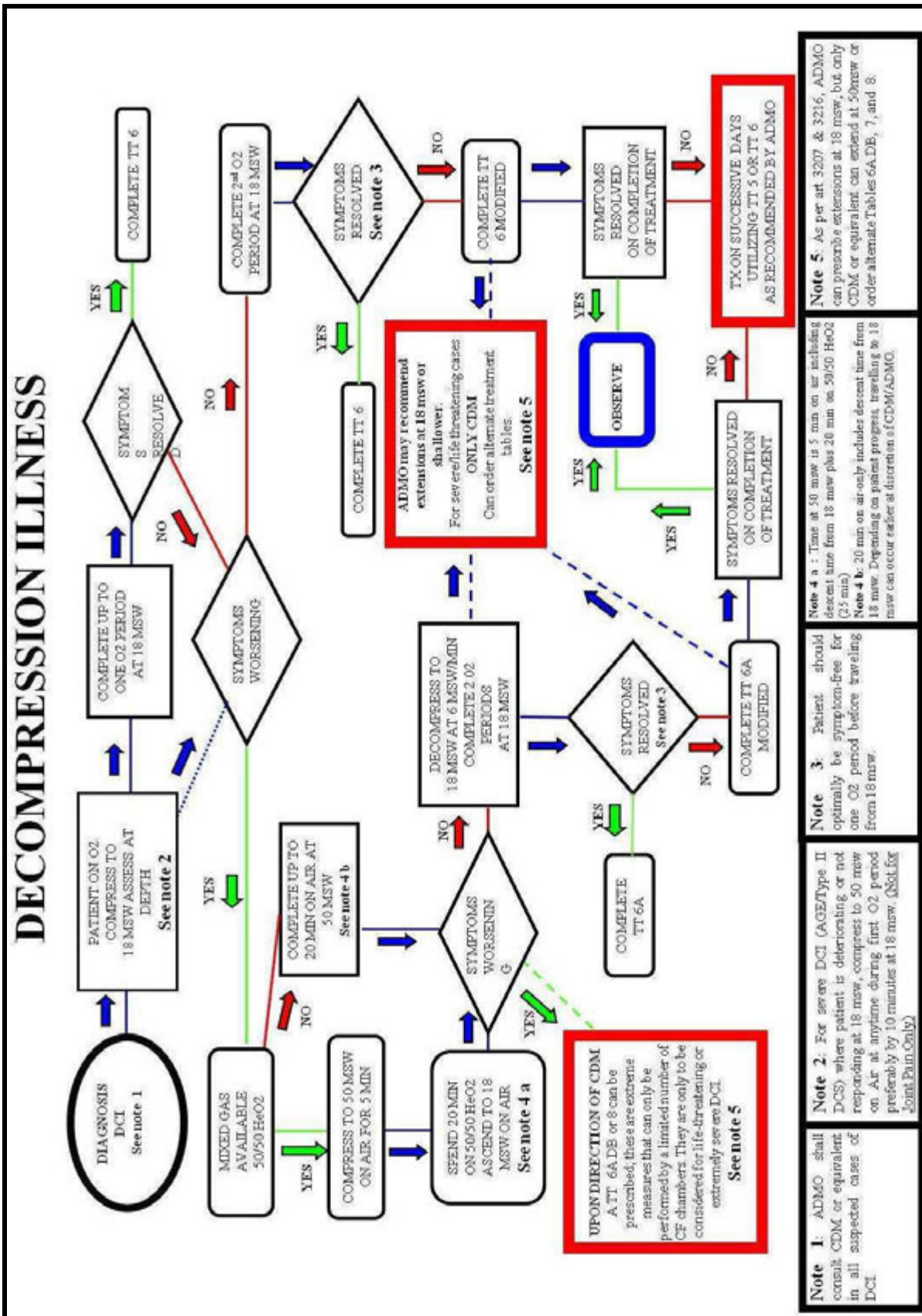


Figure 3-2-2 Decompression Illness

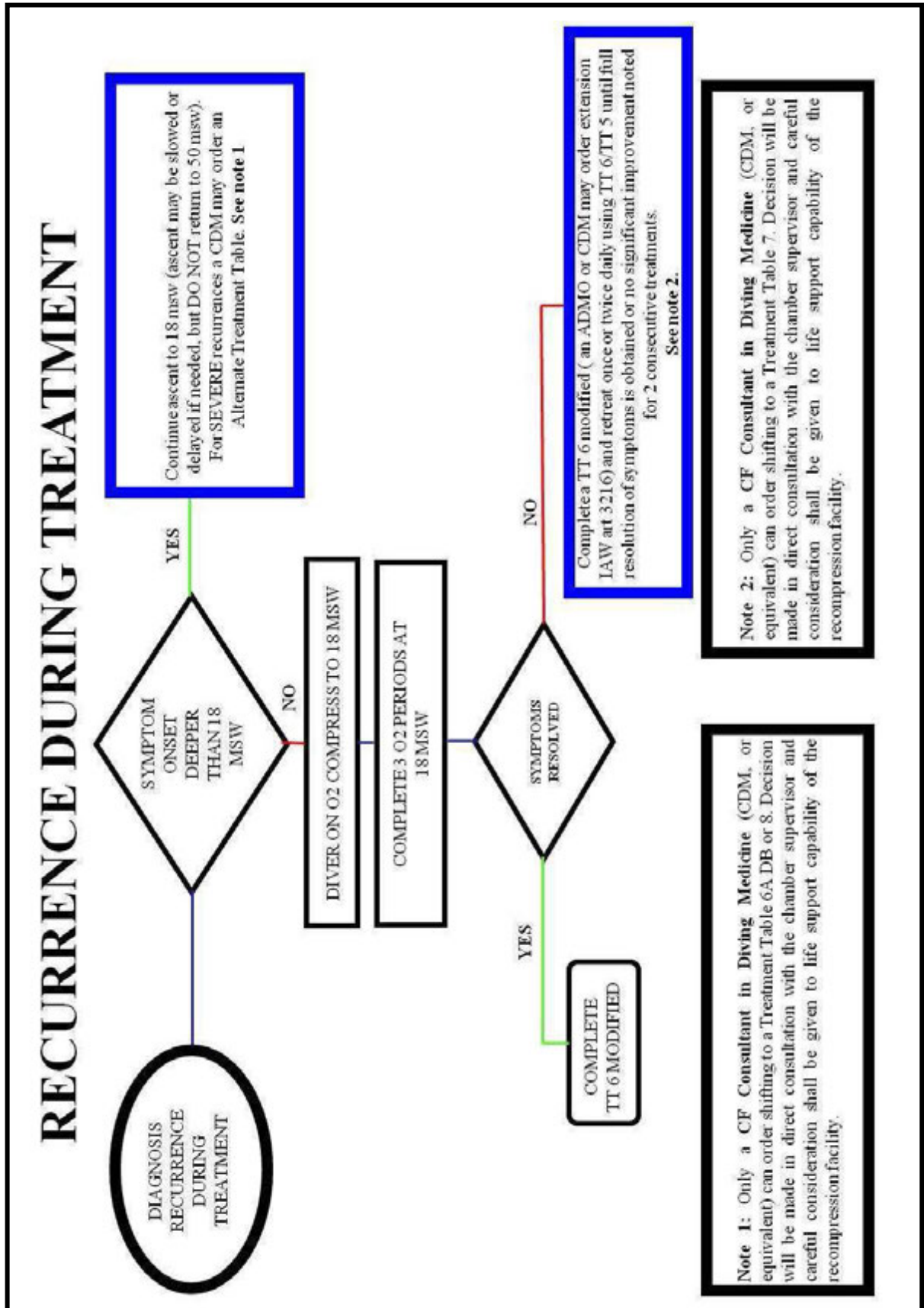


Figure 3-2-3 Recurrence During Treatment Summary

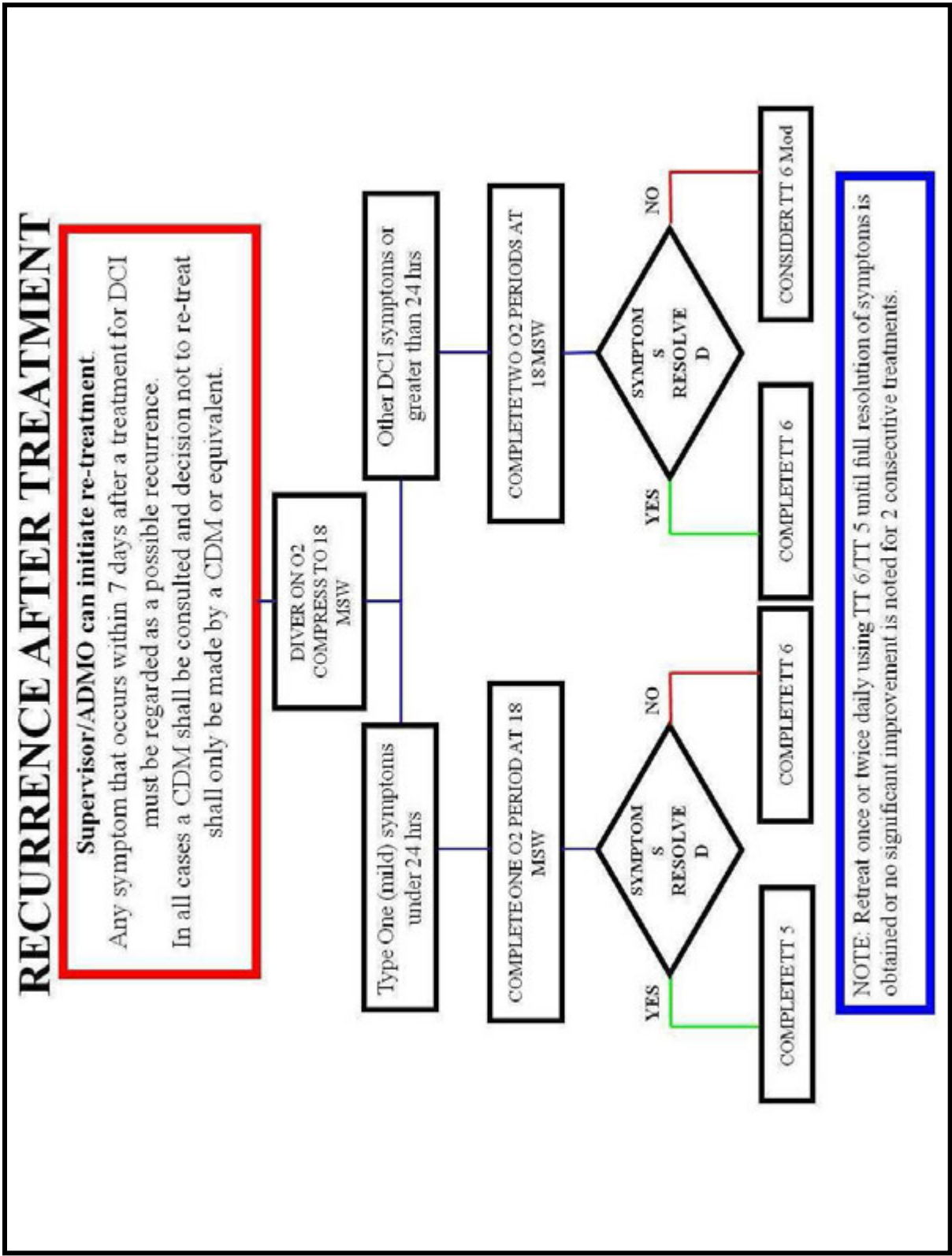


Figure 3-2-4 Recurrence After Treatment

TABLE	USE
5	<ul style="list-style-type: none"> ➤ For Decompression Sickness (DCS Type I Mild) only: where symptoms have completely resolved during transport to a RCC. ➤ For recurrence of DCS Type 1(Mild) symptoms that have completely resolved after one O2 period at 18 msw (See figure 3-2-4 Recurrence after Treatment). ➤ For Omitted Decompression, Uncontrolled Ascent and Blow-Up: ➤ For an ASYMPTOMATIC individual, if the in-water omitted decompression is equal to or less than 30 minutes and the planned RCC time is equal to or less than 30 minutes (30 min maximum).
6	<ul style="list-style-type: none"> ➤ For Decompression Sickness (DCS) and/or Arterial Gas Embolism (AGE) responding to initial 18 msw recompression. ➤ For Omitted Decompression, Uncontrolled Ascent, and Blow-Up: ➤ For an ASYMPTOMATIC individual, with 30 min or more of Omitted Decompression.
6 Modified	<ul style="list-style-type: none"> ➤ This treatment table is an extension of TT6, to be used if the patient remains symptomatic by the end of the 2nd O2 period at 18 msw.
6A	<ul style="list-style-type: none"> ➤ Treatment of SEVERE (see article 2203/2305) Arterial Gas Embolism (AGE) and/or Decompression Sickness (DCS) symptoms deteriorating or not responding at 18 msw but resolving at 50 msw. ➤ The decision to go to 50 msw should be made during the first 10 minutes of the initial 20 minute O2 period at 18 msw. A final decision can be delayed up to the end of the first 20 minute O2 period.
6A Modified	<ul style="list-style-type: none"> ➤ This treatment table is an extension of TT 6A, to be used if the patient remains symptomatic by the end of the 2nd O2 period at 18 msw on the ascent.
6A DB (Deep Blow-up)	<ul style="list-style-type: none"> ➤ For SEVERE symptoms/findings that persist despite aggressive treatment using conventional treatment tables. TT 6A DB may be used as an extreme measure. It shall be used only on advice of a CDM, and only if 50/50 HeO2 is available.
7	<ul style="list-style-type: none"> ➤ Treatment Table 7 is considered a heroic measure and shall only be used for extreme cases. ➤ Treatment Table 7 is an extension at 18 msw of all Treatment Tables previously described.
8	<ul style="list-style-type: none"> ➤ Deteriorating SEVERE (see article 2203/2305) Arterial Gas Embolism (AGE) and/or Decompression Sickness (DCS) symptoms at 50 msw. ➤ Recurrence of SEVERE (see article 2203/2305) Arterial Gas Embolism (AGE) and/or Decompression Sickness (DCS) symptoms during decompression from 50 msw to 18 msw. ➤ When it is determined that such patients as noted above would achieve additional benefits from time at 50 msw beyond the maximum time at 50 msw permitted by TT 6A/6A DB. ➤ Treatment of severe DCI resulting from deep blow-up, deteriorating or not responding at 50 msw on TT 6A DB.

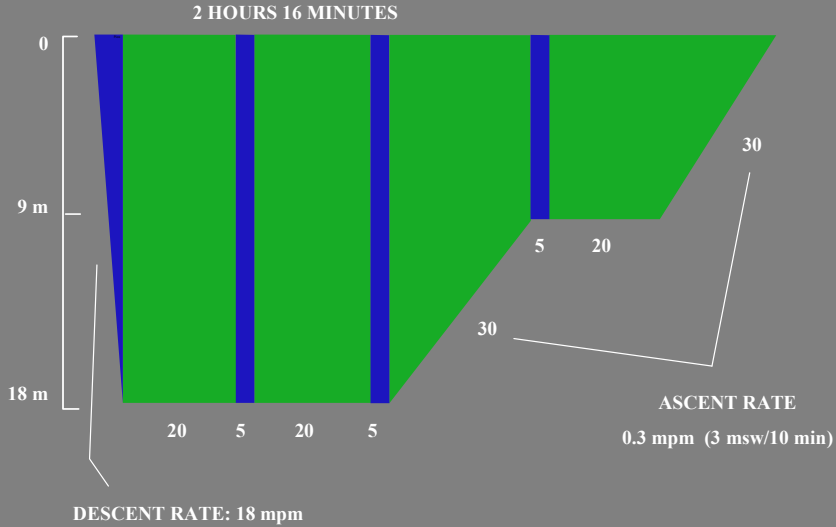
Figure 3-2-5 Recompression Treatment Table Use

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ANNEX A
CHAPTER 3
OXYGEN
TREATMENT TABLES

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TABLE 5



Depth (MSW)	Time (Minutes)	Breathing Medium	Total Elapsed Time (Minutes)
0-18	1	Oxygen/Air	1
18	20	Oxygen	21
18	5	Air	26
18	20	Oxygen	46
18	5	Air	51
18-9	30	Oxygen	81
9	5	Air	86
9	20	Oxygen	106
9-0	30	Oxygen	136

TABLE 5

Uses:

1. For Decompression Sickness (DCS Type I Mild) only: where symptoms have completely resolved during transport to a RCC.
2. For recurrence of DCS Type 1(Mild) symptoms that have completely resolved after one O2 period at 18 msw (See figure 3-2-4 Recurrence after Treatment).
3. For Omitted Decompression, Uncontrolled Ascent and Blow-Up:
4. For an **ASYMPTOMATIC** individual, if the in-water omitted decompression is equal to or less than 30 minutes and the planned RCC time is equal to or less than 30 minutes (30 min maximum)

Descent rate:

1. 18 mpm or slower.
2. Diving to 18 msw should be on O2 but can be done on air, based on patient condition

Ascent rate:

1. 0.3 mpm (3 msw/10 min)

Time:

1. O2 time starts at 18 msw once patient confirmed on O2 (next whole min)

O2 Toxicity at 18 and 9 msw:

1. **Seizure at 18 msw:** Should a seizure occur at 18 msw or during travelling, stop the chamber, discontinue oxygen breathing. When the convulsion has stopped and the patient is breathing normally, the chamber will be brought up to 9 msw at 9 mpm on air; the supervisor must consider slower ascent rates and possible delays. At 9 msw after symptoms have resolved wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206). If a second seizure occurs at 9 msw considerations should be taken to abort treatment, based on patient condition.
2. If oxygen breathing must be interrupted due to **CNS O2 toxicity (VENTID)**, discontinue oxygen breathing, allow for symptoms to subside, wait an additional 15 minutes and resume the treatment table breathing oxygen from the point of interruption.
3. If **CNS O2 toxicity (VENTID) occurs a second time** deeper than 9 msw, stop the chamber, discontinue oxygen breathing. When patient is relaxed and breathing normally, travel to 9 msw at 9 mpm on air (supervisor can consider slower ascent rate). At 9 msw after symptoms have resolved wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206).

4. **If CNS O2 toxicity (VENTID) occurs a third time**, consideration should be made to terminating or modifying the treatment table. If treatment table is continued, wait at least 15 min after symptom has resolved and resume the treatment table breathing oxygen from the point of interruption. If the treatment table is terminated, the inside attendant's decompression requirements must be considered.

5. After termination or completion of a treatment table, the patient must breathe a minimum of 6 hours of air on the surface, prior to commencing a second treatment, unless symptoms or clinical situation dictate otherwise.

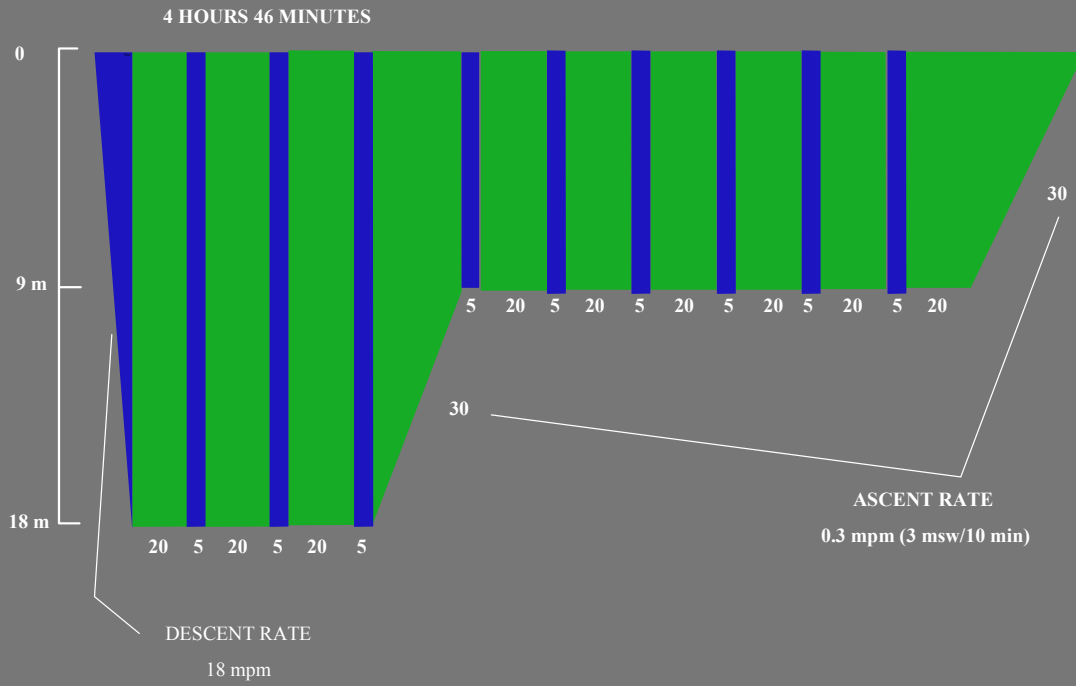
Attendant:

1. Attendant will breathe air except during O2 periods as specified below in para 2.
2. Attendant breathes O2 for a total of 30 minutes (30 minutes during ascent to the surface).

Delays:

1. The most common causes of delays are examinations, eating and O2 toxicity problems.
 - a. Maximum delay at 18 msw on ascent is 50 minutes.
 - b. Maximum delay at 9 msw on ascent is 25 minutes.
2. Delays at 18 msw or during ascent to 9 msw less than 10 min and/or a delay at 9 msw less than 25 min require the attendant to breathe O2 for a total of 30 minutes (30 minutes during ascent to the surface).
3. Delays at 18 msw or during ascent to 9 msw greater than 10 min up to 50 min require the attendant to breathe O2 for a total of 50 min. (last 20 min O2 period at 9 msw and 30 minutes during ascent to the surface). Additional delays at 9 msw up to 25 min do not require any further O2 for the attendant.
4. Delays at 18 msw or during ascent to 9 msw greater than 50 min, switch to TT6 and follow instructions.

TABLE 6



Depth (MSW)	Time (Minutes)	Breathing Medium	Total Elapsed Time (Minutes)
0-18	1	Oxygen/Air	1
18	20	Oxygen	21
18	5	Air	26
18	20	Oxygen	46
18	5	Air	51
18	20	Oxygen	71
18	5	Air	76
18-9	30	Oxygen	106
9	5	Air	111
9	20	Oxygen	131
9	5	Air	136
9	20	Oxygen	156
9	5	Air	161
9	20	Oxygen	181
9	5	Air	186
9	20	Oxygen	206
9	5	Air	211
9	20	Oxygen	231
9	5	Air	236
9	20	Oxygen	256
9-0	30	Oxygen	286

TABLE 6**Use:**

1. For Decompression Sickness (DCS) and/or Arterial Gas Embolism (AGE) responding to initial 18 msw recompression.
2. For Omitted Decompression, Uncontrolled Ascent, and Blow-Up:
 - a. For an **ASYMPTOMATIC** individuals with 30 min or more of Omitted Decompression.
 - b. All **SYMPTOMATIC** individuals with Omitted Decompression will be managed as per DCI flow charts IAW figure 3-2-2.

Descent rate:

1. 18 mpm or slower.
2. Diving to 18 msw should be on O2 but can be done on air based on patient condition.

Ascent rate:

1. 0.3 mpm (3 msw/10 min)

Time:

1. O2 time starts at 18 msw once patient confirmed on O2 (next whole min)

O2 Toxicity at 18 and 9 msw:

1. **Seizure at 18 msw:** Should a seizure occur at 18 msw, stop the chamber, discontinue oxygen breathing. When the convulsion has stopped and the patient is breathing normally, the chamber will be brought up to 9 msw at 9 mpm on air; the supervisor must consider slower ascent rates and possible delays. At 9 msw after symptoms have resolved wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206). If a second seizure occurs at 9 msw considerations should be taken to abort treatment, based on patient condition.
2. If oxygen breathing must be interrupted due to **CNS O2 toxicity (VENTID)**, discontinue oxygen breathing, allow for symptoms to subside, wait an additional 15 minutes and resume the treatment table breathing oxygen from the point of interruption.
3. **If CNS O2 toxicity (VENTID)** occurs a second time deeper than 9 msw, stop the chamber, discontinue oxygen breathing. When patient is relaxed and breathing normally, travel to 9 msw at 9 mpm on air (supervisor can consider slower ascent rate). At 9 msw after symptoms have resolved, wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206).

4. **If CNS O2 toxicity (VENTID) occurs a third time**, consideration should be made to terminating or modifying the treatment table. If treatment table is continued wait at least 15 min after symptom has resolved and resume the treatment table breathing oxygen from the point of interruption. If the treatment table is terminated, the inside attendant's decompression requirements must be considered.

5. After termination or completion of a treatment table, the patient must breathe a minimum of 6 hours of air on the surface, prior to commencing a second treatment, unless symptoms or clinical situation dictate otherwise.

Attendant:

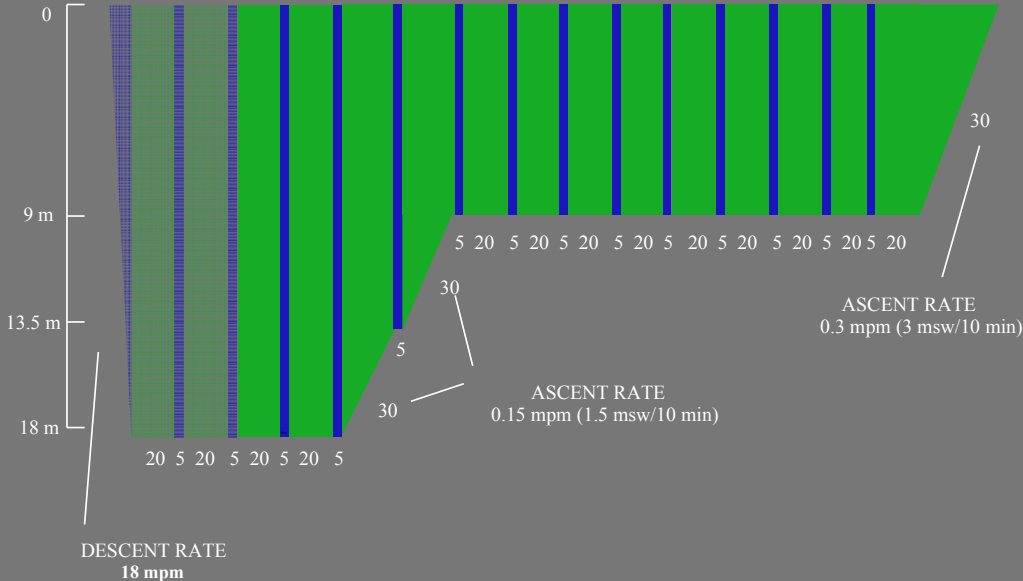
1. Attendant will breathe air except during O2 periods as specified below in para 2.
2. Attendant breathes O2 for a total of 50 minutes (last 20 min O2 period at 9 msw and 30 minutes during ascent to the surface).

Delays:

1. The most common causes of delays are examinations, eating and O2 toxicity problems.
 - a. Maximum delay at 18 msw on ascent is 150 minutes.
 - b. Maximum delay at 9 msw on ascent is 150 minutes.
2. Delays at 18 msw or during ascent to 9 msw of up to 25 min require the attendant to breathe O2 for a total of 50 minutes (last 20 min O2 period at 9 msw and 30 minutes during ascent to the surface).
3. Delays at 9 msw do not require additional O2 for the attendant. The attendant breathes O2 for the standard 50 minutes noted above.
4. Delays at 18 msw or during ascent to 9 msw greater than 25 min up to 100 min require the attendant to breathe O2 for a total of 70 min. (last two 20 min O2 periods at 9 msw and 30 minutes during ascent to the surface). Additional delays at 9 msw do not require any further O2 for the attendant.
5. Delays at 18 msw or during ascent to 9 msw greater than 100 min up to 150 min require the attendant to breathe O2 for a total of 90 min. (last three 20 min O2 periods at 9 msw and 30 minutes during ascent to the surface). Additional delays at 9 msw do not require any further O2 for the attendant.

TABLE 6 Modified

7 HOURS 1 MINUTE



Depth (MSW)	Time (Minutes)	Breathing Medium	Total Elapsed Time (Minutes)	Depth (MSW)	Time (Minutes)	Breathing Medium	Total Elapsed Time (Minutes)
0-18	1	Oxygen	1	9	5	Air	221
18	20	Oxygen	21	9	20	Oxygen	241
18	5	Air	26	9	5	Air	246
18	20	Oxygen	46	9	20	Oxygen	266
18	5	Air	51	9	5	Air	271
18	20	Oxygen	71	9	20	Oxygen	291
18	5	Air	76	9	5	Air	296
18	20	Oxygen	96	9	20	Oxygen	316
18	5	Air	101	9	5	Air	321
18-13.5	30	Oxygen	131	9	20	Oxygen	341
13.5	5	Air	136	9	5	Air	246
13.5-9	30	Oxygen	166	9	20	Oxygen	366
9	5	Air	171	9	5	Air	271
9	20	Oxygen	191	9	20	Oxygen	391
9	5	Air	196	9-0	30	Oxygen	421
9	20	Oxygen	216				

TABLE 6 MODIFIED

Use:

1. This treatment table is an extension of TT6, to be used if the patient remains symptomatic by the end of the 2nd O₂ period at 18 msw.

Ascent rate:

1. From 18 - 9 msw travel at 0.15 mpm (1.5 msw/10 min) with one 5 min air break at 13.5 msw; from 9 msw to surface travel at 0.3 mpm (3 msw/10 min)

Time:

1. O₂ time continues from TT6.

O₂ Toxicity at 18 and 9 msw:

1. **Seizure at 18 msw:** Should a seizure occur at 18 msw or during travelling, stop the chamber, discontinue oxygen breathing. When the convulsion has stopped and the patient is breathing normally, the chamber will be brought up to 9 msw at 9 mpm on air; the supervisor must consider slower ascent rates and possible delays. At 9 msw after symptoms have resolved, wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206). If a second seizure occurs at 9 msw, considerations should be taken to abort treatment, based on patient condition.
2. If oxygen breathing must be interrupted due to **CNS O₂ toxicity (VENTID)**, discontinue oxygen breathing, allow for symptoms to subside, wait an additional 15 minutes and resume the treatment table breathing oxygen from the point of interruption.
3. If **CNS O₂ toxicity (VENTID) occurs a second time** deeper than 9 msw, stop the chamber, discontinue oxygen breathing. When patient is relaxed and breathing normally, travel to 9 msw at 9 mpm on air (supervisor can consider slower ascent rate). At 9 msw after symptoms have resolved, wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206).
4. If **CNS O₂ toxicity (VENTID) occurs a third time**, consideration should be made to terminating or modifying the treatment table. If treatment table is continued, wait at least 15 min after symptom has resolved and resume the treatment table breathing oxygen from the point of interruption. If the treatment table is terminated, the inside attendant's decompression requirements must be considered.
5. After termination or completion of a treatment table, the patient must breathe a minimum of 6 hours of air on the surface, prior to commencing a second treatment, unless symptoms or clinical situation dictate otherwise.

Attendant:

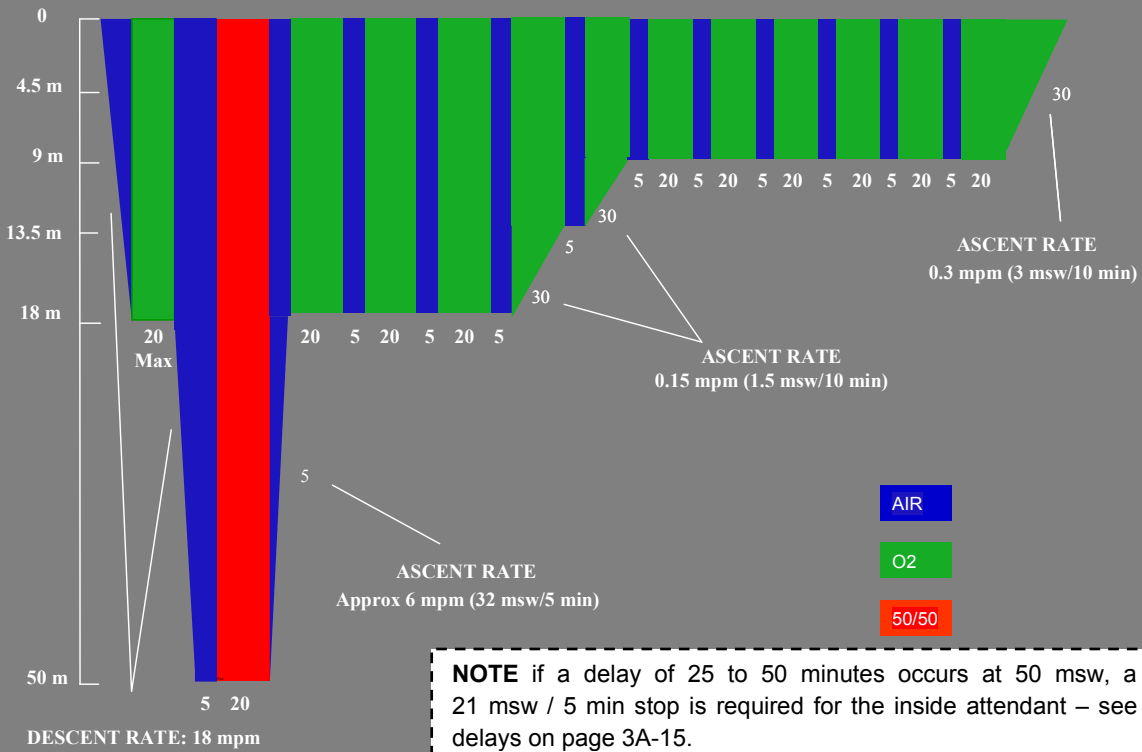
1. Attendant will breathe air except during O₂ periods as specified below in para 2.
2. Attendant breathes O₂ for a total of 70 minutes (last two 20 min O₂ periods at 9 msw and 30 minutes during ascent to the surface).

Delays:

1. The most common causes of delays are examinations, eating and O₂ toxicity problems.
 - a. Maximum delay at 18 msw on ascent is 150 minutes.
 - b. Maximum delay at 9 msw on ascent is 150 minutes.
2. Delays at 18 msw or during ascent to 9 msw of up to 100 min require the attendant to breathe O₂ for a total of 70 minutes (last two 20 min O₂ periods at 9 msw and 30 minutes during ascent to the surface). Additional delays at 9 msw do not require any further O₂ for the attendant.
3. Delays at 18 msw or during ascent to 9 msw greater than 100 min up to 150 min require the attendant to breathe O₂ for a total of 90 min. (last three 20 min O₂ periods at 9 msw and 30 minutes during ascent to the surface). Additional delays at 9 msw do not require any further O₂ for the attendant.

TABLE 6A

6 HOURS 11 MINUTES



Depth (MSW)	Time (Minutes)	Breathing Medium	Total Elapsed Time (Minutes)	Depth (MSW)	Time (Minutes)	Breathing Medium	Total Elapsed Time (Minutes)
0 - 18	1	Oxygen/Air	1	9	5	Air	196
18	20	Oxygen	21	9	20	Oxygen	216
18 - 50	5	Air	26	9	5	Air	221
50	20	HeO2	46	9	20	Oxygen	241
50 - 18	5	Air	51	9	5	Air	246
18	20	Oxygen	71	9	20	Oxygen	266
18	5	Air	76	9	5	Air	271
18	20	Oxygen	96	9	20	Oxygen	291
18	5	Air	101	9	5	Air	296
18	20	Oxygen	121	9	20	Oxygen	316
18	5	Air	126	9	5	Air	321
18 - 13.5	30	Oxygen	156	9	20	Oxygen	341
13.5	5	Air	161	9 - 0	30	Oxygen	371
13.5 - 9	30	Oxygen	191				

TABLE 6A**Use:**

1. Treatment of **SEVERE** (see article 2203/2305) Arterial Gas Embolism (AGE) and/or Decompression Sickness (DCS) symptoms deteriorating or not responding at 18 msw but resolving at 50 msw.
2. The decision to go to 50 msw should be made during the first 10 minutes of the initial 20 minute O₂ period at 18 msw. A final decision can be delayed up to the end of the first 20 minute O₂ period.

Descent rate:

1. Diving to 18 msw at 18 mpm or slower, should be on O₂ but can be done on air depending on patient condition.
2. Dive to 50 msw at 18 mpm or slower on air.

Ascent rate:

1. Ascend from 50 to 18 msw at approx 6 mpm (32 msw/5 min).
2. Ascend from 18 - 9 msw at 0.15 mpm (1.5 msw/10 min) with a 5 min air break at 13.5 msw.
3. Ascend from 9 msw to the surface at 0.3 mpm (3 msw/10 min).

Time:

1. O₂ time starts at 18 msw once patient confirmed on O₂ (next whole min).
2. Every 20 min of O₂ or 50/50 HeO₂ breathing must be followed by a 5 min air break.
3. Maximum time at 18 msw on O₂ prior to descending to 50 msw is 20 min.
4. Maximum time at 50 msw is 25 minutes (including descent from 18 msw).
5. Patient shall breathe air from 18 msw to 50 msw for 5 min (air break).
6. At 50 msw, on completion of air break, put patient on 50/50 HeO₂ for 20 min. Patient condition should be assessed prior to ascent to 18 msw.
7. On completion of 20 min on 50/50 HeO₂, travel to 18 msw at approx 6 mpm (32 msw/5 min) on Air. On arrival at 18 msw, switch patient to 100% O₂ and resume 20 min O₂ periods/5 min air break cycles. Depending on patient's condition, CDM/ADMO can decrease time at 50 msw and travel early to 18 msw.
8. If no 50/50 HeO₂ available at 50 msw, patient may breathe air for a maximum of 20 min (including descent from 18 msw). Bottom Time on air at 50 msw should be limited to as little as possible to resolve symptoms but should be no greater than 20 minutes. Depending on patient's condition, CDM/ADMO can decrease time at 50 msw and travel early to 18 msw.

O2 Toxicity at 50 msw:

1. Due to the high partial pressure of 50/50 HeO₂ gas at 50 msw (ppO₂ 3.0) patient should keep movements to minimum.
2. If a Seizure occurs at 50 msw, the patient will be brought up to 18 msw at 6 mpm (32 msw/5 min) on air when the convulsion has stopped and the patient is breathing normally; supervisor must consider slower ascent rate and possible delays. At 18 msw, wait 15 min after symptoms have resolved and resume O₂ treatment.
3. If 50/50 HeO₂ breathing must be interrupted due to CNS O₂ toxicity (VENTID), discontinue 50/50 HeO₂, wait for symptoms to resolve, wait an additional 15 minutes and resume treatment with 50/50 HeO₂.
4. The time off 50/50 HeO₂ is included in the time at treatment depth. (Target maximum time at 50 msw is 25 min in this scenario).
5. If the wait times for symptom resolution and or additional 15 min wait time extends beyond the 25 min treatment time at 50 msw, commence ascent as described in para 2., above.

O2 Toxicity at 18 and 9 msw:

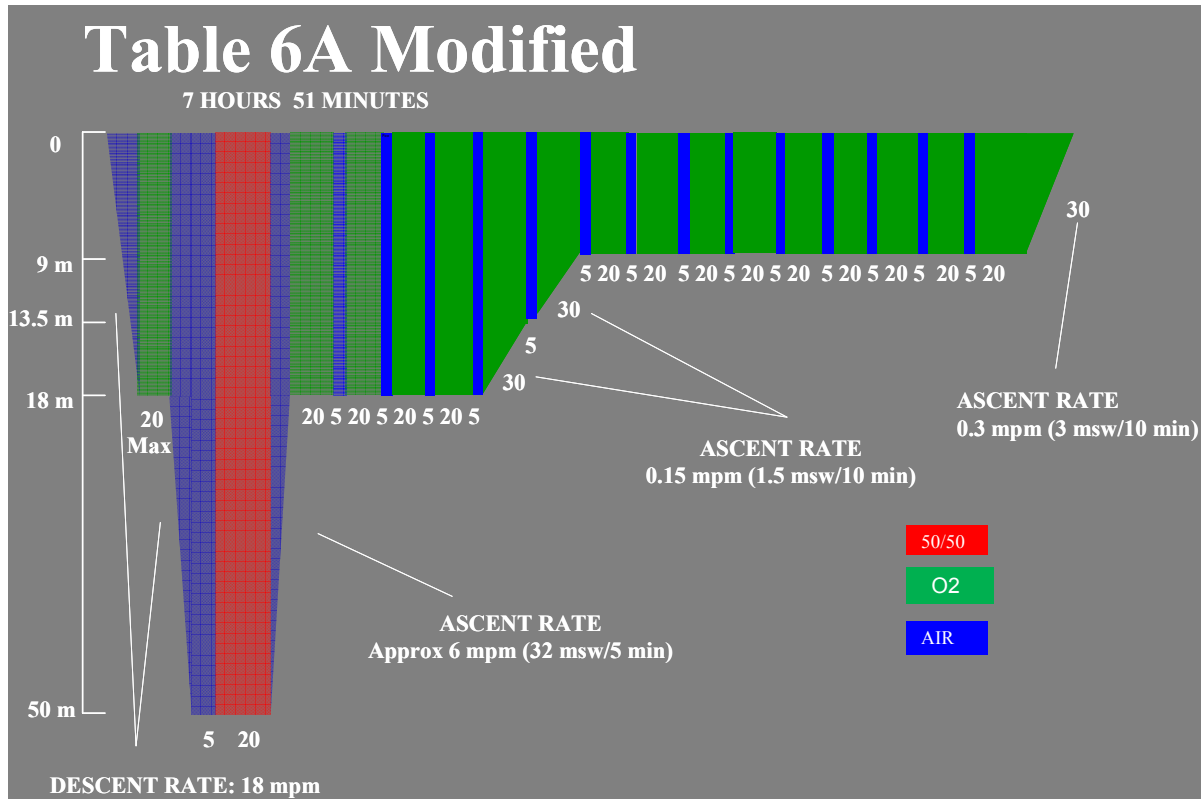
1. **Seizure at 18 msw:** Should a seizure occur at 18 msw, stop the chamber, discontinue oxygen breathing. When the convulsion has stopped and the patient is breathing normally, the chamber will be brought up to 9 msw at 9 mpm on air; the supervisor must consider slower ascent rates and possible delays. At 9 msw after symptoms have resolved wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206). If a second seizure occurs at 9 msw, considerations should be taken to abort treatment, based on patient condition.
2. If oxygen breathing must be interrupted due to **CNS O₂ toxicity (VENTID)**, discontinue oxygen breathing, allow for symptoms to subside, wait an additional 15 minutes and resume the treatment table breathing oxygen from the point of interruption.
3. **If CNS O₂ toxicity (VENTID) occurs a second time** deeper than 9 msw, stop the chamber, discontinue oxygen breathing. When patient is relaxed and breathing normally, travel to 9 msw at 9 mpm on air (supervisor can consider slower ascent rate). At 9 msw after symptoms have resolved, wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206).
4. **If CNS O₂ toxicity (VENTID) occurs a third time**, consideration should be made to terminating or modifying the treatment table. If treatment table is continued wait at least 15 min after symptom has resolved and resume the treatment table breathing oxygen from the point of interruption. If the treatment table is terminated, the inside attendant's decompression requirements must be considered.
5. After termination or completion of a treatment table, the patient must breathe a minimum of 6 hours of air on the surface, prior to commencing a second treatment, unless symptoms or clinical situation dictate otherwise.

Attendant:

1. Attendant will breathe air except during O₂ periods as specified below in para 2.
2. Attendant breathes O₂ for a total of 90 minutes (last three 20 min at 9 msw and 30 minutes during ascent to the surface).

Delays:

1. The most common causes of delays are examinations, eating and O₂ toxicity problems.
 - a. Maximum delay at 50 msw is 50 minutes.
 - b. Maximum delay at 18 msw on ascent is 150 minutes.
 - c. Maximum delay at 9 msw on ascent is 150 minutes.
2. Decompression stops are not delays.
3. Delays that occur during descent from surface or during ascent from 50 msw to 18 msw are added to the total bottom time at 50 msw.
4. The amount of O₂ the attendant is required to breathe at 9 msw due to delays at 50 msw is the amount described in paras 7., and 8., below regardless if maximum delays at 18 or 9 msw were attained or not.
5. If there were no delays occurring at 50 msw, delays up to a maximum of 75 min at 18 msw or during ascent to 9 msw, require the attendant to breathe O₂ for a total of 90 minutes (last three 20 min O₂ periods at 9 msw and 30 minutes during ascent to the surface). A combination of delays with those at 9 msw does not require any further O₂ for the attendant.
6. If no delays occur at 50 msw, delays greater than 75 min up to a maximum of 150 min at 18 msw or during ascent to 9 msw, require the attendant breathe O₂ for a total of 110 minutes (last four 20 min O₂ periods at 9 msw and 30 minutes during ascent to the surface). A combination of delays with those at 9 msw does not require any further O₂ for the attendant.
7. Delays at 50 msw or during ascent to 18 msw up to a maximum of 25 min require the attendant to breathe O₂ for a total of 110 min (last four 20 min O₂ periods at 9 msw and 30 minutes during ascent to the surface). A combination of delays with those at 18 msw and 9 msw does not require any further O₂ for the attendant.
8. Delays at 50 msw or during ascent to 18 msw greater than 25 min up to a maximum of 50 min require the attendant to breathe O₂ for a total of 130 min (last five 20 min O₂ periods at 9 msw and 30 minutes during ascent to the surface) but will require a decompression stop at 21 msw for 5 min on the ascent to 18 msw. Travel time is not included in the stop time. A combination of delays with those at 18 msw and 9 msw does not require any further O₂ for the attendant.



Depth (MSW)	Time (Minutes)	Breathing Medium	Total Elapsed Time (Minutes)	Depth (MSW)	Time (Minutes)	Breathing Medium	Total Elapsed Time (Minutes)
0-18	1	Oxygen/Air	1	9	5	Air	246
18	20	Oxygen	21	9	20	Oxygen	266
18-50	5	Air	26	9	5	Air	271
50	20	Helium/Air	46	9	20	Oxygen	291
50-18	5	Air	51	9	5	Air	296
18	20	Oxygen	71	9	20	Oxygen	316
18	5	Air	76	9	5	Air	321
18	20	Oxygen	96	9	20	Oxygen	341
18	5	Air	101	9	5	Air	346
18	20	Oxygen	121	9	20	Oxygen	366
18	5	Air	126	9	5	Air	371
18	20	Oxygen	146	9	20	Oxygen	391
18	5	Air	151	9	5	Air	396
18-13.5	30	Oxygen	181	9	20	Oxygen	416
13.5	5	Air	186	9	5	Air	421
13.5-9	30	Oxygen	216	9	20	Oxygen	441
9	5	Air	221	9-0	30	Oxygen	471
9	20	Oxygen	241				

TABLE 6A (MODIFIED)**Use:**

1. This treatment table is an extension of TT 6A, to be used if the patient remains symptomatic by the end of the 2nd O₂ period at 18 msw on the ascent.

Ascent rate:

1. Ascend from 18 to 9 msw at 0.15 mpm (1.5 msw/10 min) with a 5 min air break at 13.5 msw.
2. Ascend from 9 msw to the surface at 0.3 mpm (3 msw/10 min).

Time:

1. TT 6A Mod starts after the second O₂ period at 18 msw on the ascent.

O₂ Toxicity at 18 and 9 msw:

1. **Seizure at 18 msw:** Should a seizure occur at 18 msw, stop the chamber, discontinue oxygen breathing. When the convulsion has stopped and the patient is breathing normally, the chamber will be brought up to 9 msw at 9 mpm on air; the supervisor must consider slower ascent rates and possible delays. At 9 msw after symptoms have resolved, wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206). If a second seizure occurs at 9 msw considerations should be taken to abort treatment, based on patient condition.
2. If oxygen breathing must be interrupted due to **CNS O₂ toxicity (VENTID)**, discontinue oxygen breathing, allow for symptoms to subside, wait an additional 15 minutes and resume the treatment table breathing oxygen from the point of interruption.
3. **If CNS O₂ toxicity (VENTID) occurs a second time** deeper than 9 msw, stop the chamber, discontinue oxygen breathing. When patient is relaxed and breathing normally, travel to 9 msw at 9 mpm on air (supervisor can consider slower ascent rate). At 9 msw after symptoms have resolved, wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206).
4. **If CNS O₂ toxicity (VENTID) occurs a third time**, consideration should be made to terminating or modifying the treatment table. If treatment table is continued wait at least 15 min after symptom has resolved and resume the treatment table breathing oxygen from the point of interruption. If the treatment table is terminated, the inside attendant's decompression requirements must be considered.
5. After termination or completion of a treatment table, the patient must breathe a minimum of 6 hours of air on the surface, prior to commencing a second treatment, unless symptoms or clinical situation dictate otherwise.

Attendant:

1. Attendant will breathe air except during O2 periods as specified below in para 2.
2. Attendant breathes O2 for a total of 90 minutes (last three 20 min at 9 msw and 30 minutes during ascent to the surface).

Delays:

1. The most common causes of delays are examinations, eating and O2 toxicity problems.
 - a. Maximum delay at 50 msw is 50 minutes.
 - b. Maximum delay at 18 msw on ascent is 150 minutes.
 - c. Maximum delay at 9 msw on ascent is 150 minutes.
2. Decompression stops are not delays.
3. Delays that occur during descent from surface or during ascent from 50 msw to 18 msw are added to the total bottom time at 50 msw.
4. The amount of O2 the attendant is required to breathe at 9 msw due to delays at 50 msw is the amount described in paras 6., and 7., below regardless if maximum delays at 18 or 9 msw were attained or not.
5. If no delays occur at 50 msw, delays up to a maximum of 150 min at 18 msw or during ascent to 9 msw, require the attendant to breathe O2 for a total of 90 minutes (last three 20 min O2 periods at 9 msw and 30 minutes during ascent to the surface). A combination of delays with those at 9 msw does not require any further O2 for the attendant,
6. Delays at 50 msw or during ascent to 18 msw less than 25 min require the attendant to breathe O2 for a total of 90 min (last three 20 min O2 periods at 9 msw and 30 minutes during ascent to the surface). A combination of delays with those at 18 msw and 9 msw does not require any further O2 for the attendant.
7. Delays at 50 msw or during ascent to 18 msw greater than 25 min up to a maximum of 50 min require the attendant to breathe O2 for a total of 110 min (last four 20 min O2 periods at 9 msw and 30 minutes during ascent to the surface). A combination of delays with those at 18 msw and 9 msw does not require any further O2 for the attendant.

ANNEX B
CHAPTER 3
ALTERNATE
OXYGEN
TREATMENT TABLES

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TABLE 6A DB

Use:

1. An extreme measure, TT 6A DB shall be used only on advice of a CDM and shall only be used for SEVERE symptoms/findings that persist despite aggressive treatment using conventional treatment tables.
2. TT 6A DB shall only be considered if 50/50 HeO₂ is available.

Descent rate:

1. The dive to 50 msw should be as fast as feasible, minimum 18 mpm, on air or 50/50 HeO₂.
2. It is critical for the patient to reach treatment depth as fast as feasible and confirming patient on gas, or symptoms such as ear or sinus problems may not outweigh the need for quick recompression.

Ascent rate:

1. Ascend from 50 to 34 msw in 32 min (travel rate 0.5 mpm, 5 msw/10 min).
2. 5 min air break at 34 msw.
3. Ascend from 34 to 18 msw in 32 min (travel rate 0.5 mpm, 5 msw/10 min).
4. Ascend from 18 to 13.5 msw in 30 min (travel rate 0.15 mpm, 1.5 msw/10 min).
5. 5 min air break at 13.5 msw.
6. Ascend from 13.5 to 9 msw in 30 min (travel rate 0.15 mpm, 1.5 msw/10 min).
7. Ascend from 9 msw to the surface in 30 min (travel rate 0.3 mpm, 3 msw/10 min).

Time:

1. 50/50 HeO₂ time starts at 50 msw (next whole min).
2. Total time at 50 msw is 25 minutes.
3. At 50 msw, put patient on 50/50 HeO₂ for 20 min followed by 5 min air break.
4. On completion of the air break, ascend from 50 to 34 msw at a rate of 0.5 mpm, (5 msw/10 min) on 50/50 HeO₂ (32 min).
5. On arrival at 34 msw, switch patient to air for 5 min.
6. On completion of the air break, ascend from 34 to 18 msw at a rate of 0.5 mpm (5 msw/10 min) on 50/50 HeO₂ (32 min).
7. On arrival at 18 msw, switch patient to air for 5 min and resume 20 min O₂ periods/5 min air breaks as per Table.

O2 Toxicity at 50 msw:

1. **Seizure at 50 msw:** Should a seizure occur at 50 msw or during travelling, stop the chamber, discontinue 50/50 HeO₂ breathing and follow treatment table to 18 msw using AIR (treatment decompression time must be adhered to from 50 msw to 18 msw). When symptoms have resolved 50/50 HeO₂ can be resumed at the discretion of ADMO/Supervisor. Resume O₂ breathing at 18 msw.
2. If 50/50 HeO₂ breathing must be interrupted due to **CNS O₂ toxicity (VENTID)**, discontinue 50/50 HeO₂, wait for symptoms to resolve, wait an additional 15 minutes and resume treatment with 50/50 HeO₂.
3. The time off 50/50 HeO₂ is included in the time at treatment depth. (Time at 50 msw is 25 min).
4. If the wait times for symptom resolution and or additional 15 min wait time extends beyond the 25 min treatment time at 50 msw, commence ascent as prescribed.
5. 50/50 HeO₂ breathing can be resumed during ascent once 15 min wait time has passed.

O2 Toxicity at 18 and 9 msw:

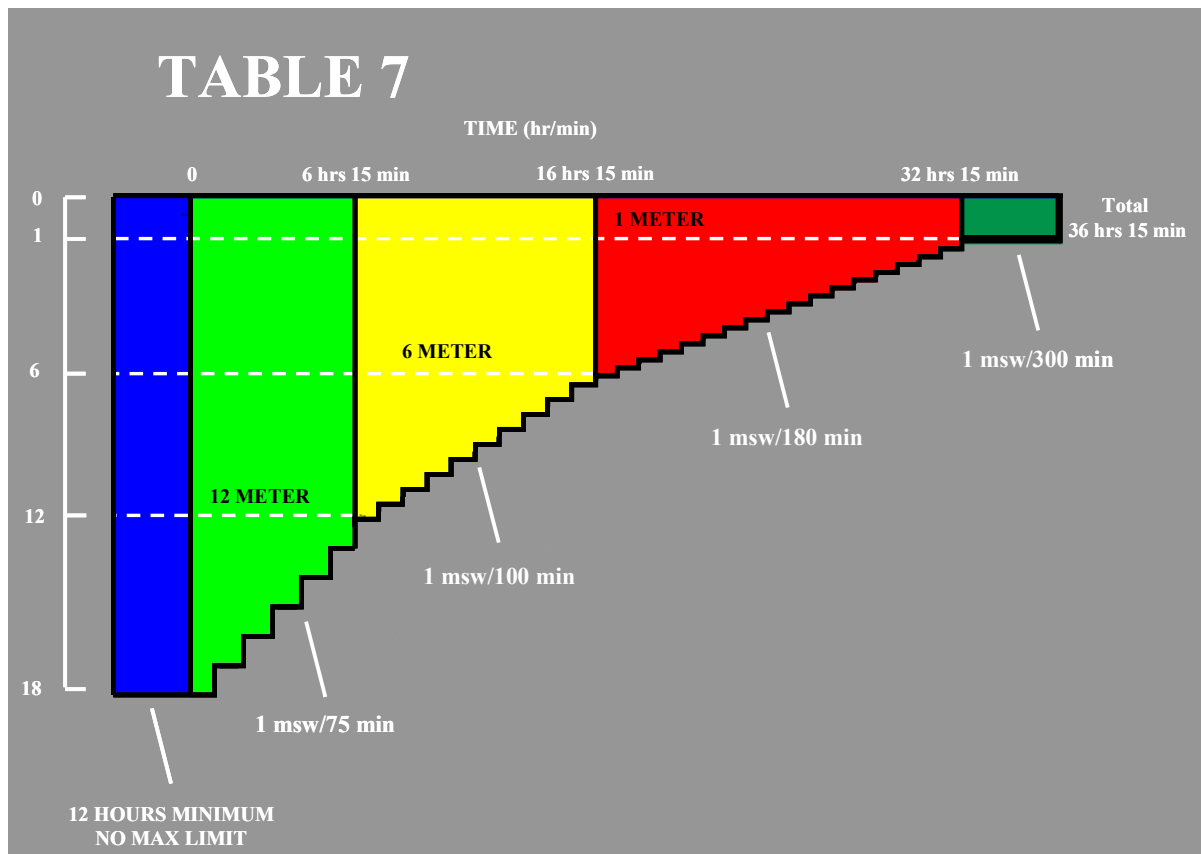
1. **Seizure at 18 msw:** Should a seizure occur at 18 msw or during travel to 9 msw, stop the chamber, discontinue oxygen breathing. When the convulsion has stopped and the patient is breathing normally, the chamber will be brought up to 9 msw at 9 mpm on air; the supervisor must consider slower ascent rates and possible delays. At 9 msw after symptoms have resolved, wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206). If a second seizure occurs at 9 msw considerations should be taken to abort treatment, based on patient condition.
2. If oxygen breathing must be interrupted due to **CNS O₂ toxicity (VENTID)**, discontinue oxygen breathing, allow for symptoms to subside, wait an additional 15 minutes and resume the treatment table breathing oxygen from the point of interruption.
3. **If CNS O₂ toxicity (VENTID) occurs a second time** deeper than 9 msw, stop the chamber, discontinue oxygen breathing. When patient is relaxed and breathing normally, travel to 9 msw at 9 mpm on air (supervisor can consider slower ascent rate). At 9 msw after symptoms have resolved, wait 15 minutes and resume treatment table breathing oxygen from the point of interruption; add all missed time at 18 msw (including travel time) to time at 9 msw (See article 3206).
4. **If CNS O₂ toxicity (VENTID) occurs a third time**, consideration should be made to terminating or modifying the treatment table. If treatment table is continued wait at least 15 min after symptom has resolved and resume the treatment table breathing oxygen from the point of interruption. If the treatment table is terminated, the inside attendant's decompression requirements must be considered.
5. After termination or completion of a treatment table, the patient must normally breathe a minimum of 6 hours of air on the surface, prior to commencing a second treatment, unless symptoms or clinical situation dictate otherwise.

Attendant:

1. Attendant will breathe air except during O2 periods as specified below in para 2.
2. Attendant breathes O2 for a total of 90 minutes (last two 20 min at 9 msw and 30 minutes during ascent to the surface).

Delays:

1. The most common causes of delays are examinations, eating and O2 toxicity problems.
 - a. Maximum delay at 50 msw is 50 minutes.
 - b. Maximum delay at 18 msw on ascent is 150 minutes.
 - c. Maximum delay at 9 msw on ascent is 150 minutes.
2. Decompression stops are not delays.
3. Delays that occur during descent from surface or during ascent from 50 msw to 18 msw are added to the total bottom time at 50 msw.
4. The amount of O2 the attendant is required to breathe at 9 msw due to delays at 50 msw is the amount described IAW paras 6., and 7., below regardless if maximum delays at 18 or 9 msw were attained or not.
5. If no delays occur at 50 msw, delays up to a maximum of 150 min at 18 msw or during ascent to 9 msw, require the attendant to breathe O2 for a total of 90 minutes (last three 20 min O2 periods at 9 msw and 30 minutes during ascent to the surface). A combination of delays with those at 9 msw does not require any further O2 for the attendant.
6. Delays at 50 msw or during ascent to 18 msw less than 10 min require the attendant to breathe O2 for a total of 90 min (last three 20 min O2 periods at 9 msw and 30 minutes during ascent to the surface). A combination of delays with those at 18 msw and 9 msw does not require any further O2 for the attendant.
7. Delays at 50 msw or during ascent to 18 msw greater than 10 min up to a maximum of 50 min require the attendant to breathe O2 for a total of 110 min (last four 20 min O2 periods at 9 msw and 30 minutes during ascent to the surface). A combination of delays with those at 18 msw and 9 msw does not require any further O2 for the attendant.

**TABLE 7**

1. **Treatment Table 7 is considered a heroic measure and shall only be used for extreme cases.**
2. Only a CF Consultant in Diving Medicine (CDM, or equivalent) can order shifting to a Treatment Table 7. Decision will be made in direct consultation with the chamber supervisor and careful consideration shall be given to life support capability of the recompression facility.
3. Because it is difficult to judge whether a particular patient's condition warrants Treatment Table 7, additional consultation may be obtained from CFEME/EDU.
4. Treatment Table 7 is an extension at 18 msw of all Treatment Tables previously described.
5. This means that considerable treatment has already been administered. Committing a patient to a Treatment Table 7 involves isolating the patient and having to manage to his medical needs in the recompression chamber for 48 hours or longer.

Use:

1. When using Treatment Table 7, a minimum of 12 hours should be spent at 18 msw, including time spent at 18 msw from the initial treatment table.
2. Severe cases may continue to deteriorate significantly over the first several hours. This should not be cause for premature changes in depth. Do not begin decompression from 18 msw for at least 12 hours.

3. At completion of the 12-hour stay, the decision must be made whether to decompress or spend additional time at 18 msw.
4. If no improvement was noted during the first 12 hours, benefit from additional time at 18 msw is unlikely and decompression should be started.
5. Solid evidence of continued benefit should be established for stays longer than 12 hours at 18 msw.
6. The actual time that can be spent at 18 msw is unlimited, but the actual additional amount of time beyond 12 hours that should be spent can only be determined by a CDM (or equivalent) in consultation with on-site supervisor based on facility limitation/capability.

Time:

1. Table 7 begins upon arrival at 18 msw usually in conjunction with a TT6, TT6 Mod, TT6A, TT6A Mod, or any other treatment tables.
2. Regardless of prior table used, only continuous time at 18 msw is to be included in the 12 hrs minimum required at 18 msw for TT7.
3. To begin TT7 after prior treatment has progressed to a depth shallower than 18 msw, recompress to 18 msw at 9 mpm.
4. Remain at 18 msw for a minimum 12 hours.
5. Treatment Table 7 decompressions is then followed to the surface.

O2 Requirement for patient:

1. The actual number and length of oxygen breathing periods should be adjusted by the CDM to suit the individual patient's clinical condition and response to pulmonary oxygen toxicity.
2. Oxygen breathing periods are 20 min O₂/5 min air break.
3. Normally, five 20 min O₂/5 min air break periods are alternated with 2 hours of continuous air breathing.
4. In conscious patients, these cycles should be continued as long as improvement is noted and the oxygen is tolerated by the patient. If oxygen breathing causes significant pain on inspiration, it should be discontinued unless it is felt that significant benefit from oxygen breathing is being obtained.
5. In unconscious patients, oxygen breathing should be stopped after a maximum of 6 cycles (30 periods of 20 min O₂/5 min air break), have been administered.
6. These cycles (20 min O₂/5 min air break with 2 hrs air breathing) may continue during ascent as long as tolerated.
7. To avoid loss of chamber seal, ascent will be halted at 1 msw and the total remaining stop time of 300 minutes taken at this depth. Ascend directly to surface upon completing of the required time.

8. Total ascent from 18 msw is 36 hours, 15 minutes plus minimum time of 12 hours spent at 18 msw for a minimum total of 48 hours and 15 min.

Decompression:

1. Decompression starts with a 1 msw upward excursion from 18 msw to 17 msw. Decompress with stops every 1 msw for times shown in profile below.

Depth	Time Interval
Between 18 to 13 msw	75 min per msw
Between 12 and 7 msw	100 min per msw
Between 6 and 1 msw	180 min per msw
At 1 msw	300 min

2. Ascent time between stops is approximately 30 seconds. Stop time begins with ascent from deeper to next shallower stop.

Attendant:

1. Original attendant is committed for the duration of TT 7.
2. Attendant is on air throughout.

Chamber condition:

1. Min O₂ - 19%
2. Max O₂ – 24 %,
3. Max CO₂ - 1.5 % (11.4 mmHg), Surface Equivalent (SEV)
4. Max temp = 30 C°

Sleeping, Resting, and Eating:

1. Several attendants should be available when using Treatment Table 7.
2. Other attendants may be locked in and out as required and decompressed on CF table 2.
3. During sleep, the patient's condition should be monitored closely and vital signs recorded at intervals appropriate to their condition.
4. Food may be taken during any air breaks and records of fluid intake and output shall be maintained.

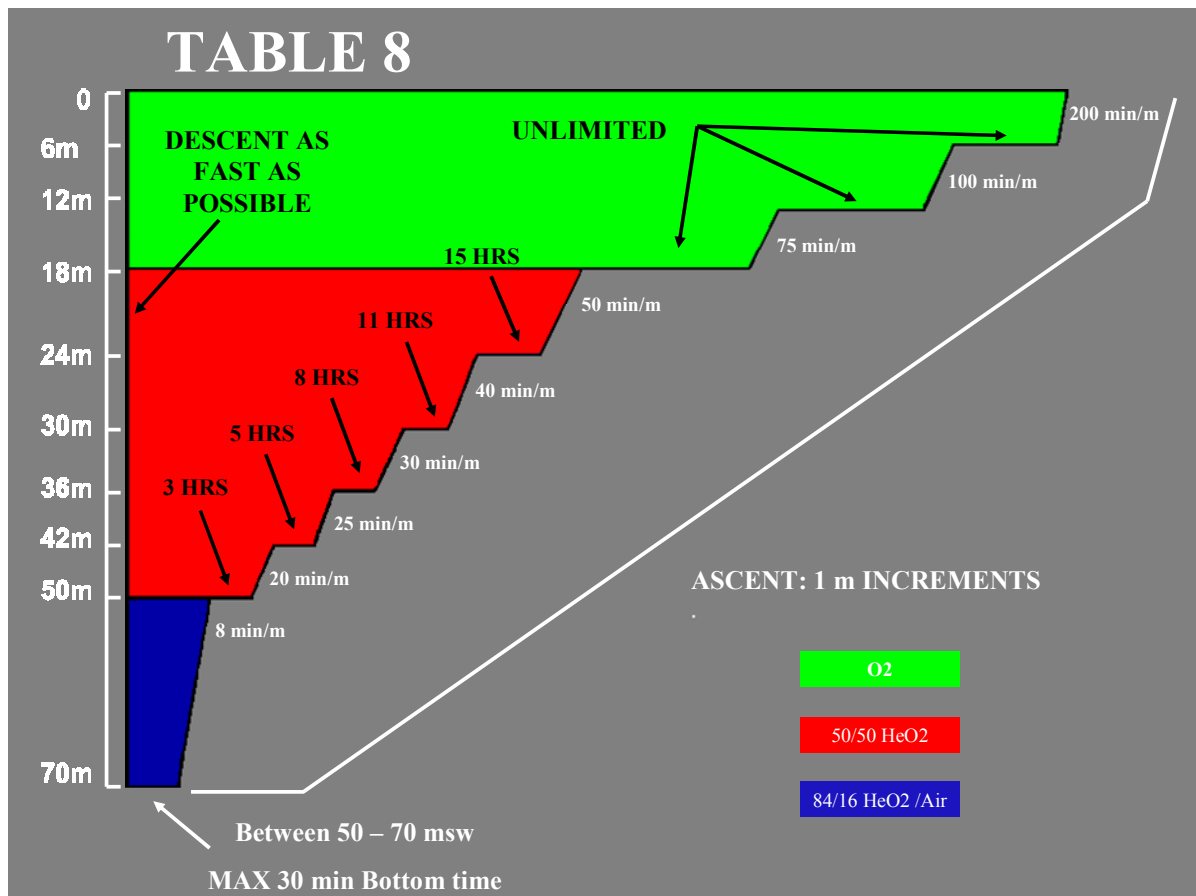
Carbon Dioxide Monitoring:

1. Chamber carbon dioxide will be monitored continuously.
2. Monitors generally read CO₂ percentage once chamber air has been exhausted to the surface.

3. The CO₂% reading at the surface 1 Bar must be corrected for depth. To keep chamber CO₂ below 1.5% SEV (11.4 mmHg), the surface CO₂ monitor values should remain below 0.78% with chamber depth at 9 msw, 0.53% with chamber depth 18 msw, and 0.25% with the chamber at 50 msw.

Oxygen Control:

1. Treatment Table 7 is performed with a chamber atmosphere of air.
2. The oxygen level must be maintained between 19% and 24%.
3. If the level of oxygen in the chamber goes above 24%, ventilation with air should be used to bring the oxygen percentage down.

**TABLE 8****Use:**

1. Treatment Table 8 is considered a heroic measure and shall only be used for extreme cases at depth of 50 msw or deeper.
2. Only a CF Consultant in Diving Medicine (CDM, or equivalent) can order shifting to a Treatment Table 8. Decision will be made in direct consultation with the chamber supervisor and careful consideration shall be given to life support capability of the recompression facility.
3. Because it is difficult to judge whether a particular patient's condition warrants Treatment Table 8, additional consultation may be obtained from CFEME/EDU.

Treatment Table 8 is considered for:

1. Deteriorating **SEVERE** (see article 2203/2305) Arterial Gas Embolism (AGE) and/or Decompression Sickness (DCS) symptoms at 50 msw;
2. Recurrence of **SEVERE** (see article 2203/2305) Arterial Gas Embolism (AGE) and/or Decompression Sickness (DCS) symptoms during decompression from 50 msw to 18 msw;

3. When it is determined that such patients as noted above would achieve additional benefits from time at 50 msw beyond the maximum time at 50 msw permitted by TT 6A/6A DB.
4. It is not designed to treat all residual symptoms that do not improve at 50 msw and should never be used to treat residual pain. Committing a patient to a Treatment Table 8 involves isolating the patient and having to manage to his medical needs in the recompression chamber for 57 hours or longer.

Time:

1. Recompress the patient to the depth of relief not to exceed 70 msw. Enter table at depth of relief - the min and max duration are as indicated below. The descent rate is as fast as tolerable.
2. The maximum time at 70 msw (deepest depth) is 30 minutes. For 50 msw, the maximum time is 3 hours.
3. Decompression begins with a 1 msw reduction in pressure. Stop times are shown on the table. The stop time begins when leaving the previous depth. Ascend to the next stop in approximately 30 seconds.
4. Stop times apply to all stops within the band up to the next quoted depth. For example; for ascent from 50 msw, stops of 20 minutes are made at 49 msw and every 1-msw interval to 43 msw. At 42 msw, the stop time becomes 25 minutes. Once begun, decompression is continuous. For example when decompressing from 69 msw, ascent is not halted at 50 msw for 3 hours. However, ascent may be halted at 18 msw and shallower for any length of time.
5. Patient breathes air or an 84/16 HeO₂ mixture at depth greater than 51 msw, 50/50 HeO₂ mixture at depth between 50 msw and 19 msw, and O₂ at 18 msw or shallower.
6. Attendant may breathe air or an 84/16 HeO₂ mixture at depth greater than 50 msw by double seal oral nasal mask to reduce narcosis. At 50 msw and shallower, the attendant will breathe air.
7. Normally, 1 cycle is defined as; five 20 min O₂/HeO₂ and 5 min air break periods, alternated with 2 hours of continuous air breathing.
8. In conscious patients, these cycles (five 20 min O₂/HeO₂ and 5 min air breaks with 2 hrs air breathing) should be continued as long as improvement is noted and the oxygen is tolerated by the patient. If oxygen breathing causes significant pain on inspiration, it should be discontinued unless it is felt that significant benefit from oxygen breathing is being obtained.

Depth of relief	Min time at depth	Max time at depth	Decompression Stops	Decompression time per metre
Between 51 and 70 msw	8 min	30 min	Between 70 and 51 msw	8 min/m
Between 43 and 50 msw	20 min	3 hrs	Between 50 and 43 msw	20 min/m
Between 37 and 42 msw	25 min	5 hrs	Between 42 and 37 msw	25 min/m
Between 31 and 36 msw	30 min	8 hrs	Between 36 and 31 msw	30 min/m
Between 25 and 30 msw	40 min	11 hrs	Between 30 and 25 msw	40 min/m
Between 19 and 24 msw	50 min	15 hrs	Between 24 and 19 msw	50 min/m
Between 13 and 18 msw	75 min	Unlimited	Between 18 and 13 msw	75 min/m
Between 7 and 12 msw	100 min	Unlimited	Between 12 and 7 msw	100 min/m
Between 1 and 6 msw	200 min	Unlimited	Between 6 and 1 msw	200 min/m

9. In unconscious patients, oxygen breathing should be stopped after a maximum of 6 cycles (O₂/HeO₂ five 20 min O₂/HeO₂ and 5 min air break with 2 hrs air breathing) breathing have been administered.

10. These cycles (five 20 min O₂/HeO₂ and 5 min air break with 2 hrs air breathing) may continue during ascent as long as tolerated.

11. To avoid loss of chamber seal, ascent will be halted at 1 msw and the total remaining stop time of 200 minutes taken at this depth. Ascend directly to surface upon completing of the required time.

12. Total ascent from 70 msw is 57 hours, 12 minutes. For a 50 msw recompression, total ascent time is 53 hours, 52 minutes and for an 18 msw recompression, 36 hours.

Attendant:

1. Original attendant is committed for the duration of TT8.

Chamber condition:

1. Min O₂: 19%
2. Max O₂: 24 %,
3. Max CO₂: 1.5 % (11.4 mmHg), Surface Equivalent.
4. Max temp: 30 C°

Sleeping, Resting, and Eating:

1. Several attendants should be available when using Treatment Table 8.
2. Other attendants may be locked in and out as required and decompressed on CF table 2.
3. During sleep, the patient's condition should be monitored closely and vital signs recorded at intervals appropriate to their condition.
4. Food may be taken during any air breaks and records of fluid intake and output shall be maintained.

Carbon Dioxide Monitoring:

1. Chamber carbon dioxide will be monitored continuously.
2. Monitors generally read CO2 percentage once chamber air has been exhausted to the surface.
3. The CO2% reading at the surface 1 Bar must be corrected for depth. To keep chamber CO2 below 1.5% SEV (11.4 mmHg), the surface CO2 monitor values should remain below 0.78% with chamber depth at 9 msw, 0.53% with chamber depth 18 msw, and 0.25% with the chamber at 50 msw.

Oxygen Control:

1. Treatment Table 8 is performed with a chamber atmosphere of air.
2. The oxygen level must be maintained between 19% and 24%.
3. If the level of oxygen in the chamber goes above 24%, ventilation with air should be used to bring the oxygen percentage down.