

Vasculitis as a result of radiotherapy delays healing and healing can be assisted by hyperbaric oxygen. Radiation osteonecrosis, especially of the mandible, has responded well to this form of treatment, after which effective surgical reconstruction is practical.

Our experience with pearl divers is that the incidence of decompression sickness is relatively low considering the repetitive nature of their diving and the long times they spend each day at depth. Dysbaric illness is usually associated with a lapse from their normally accepted diving practice.

Other developments in Western Australia

Other "professional" divers and diving fishermen perform frequent repetitive dives, often paying only lip service to accepted tables. Many give a history of "getting away with it" for some years. Detailed enquiry often reveals stories of paraesthesia, niggles and extreme fatigue especially early in the season.

In the recreational group of divers, the experienced divers have been those undergoing advance courses such as for dive Master qualification. They usually dived, technically within the accepted tables, but had exacerbating factors such as hard work, fatigue, hypothermia or strenuous activity after the dive. Student divers were more likely to be fatigued with dives near the limit of the tables.

Notable among the divers was the small number of pure type 1 decompression sickness. Careful examination usually elicited paraesthesia, numbness, problems with balance, alterations of concentration and short term memory loss. A number of patients reported that during recompression they felt as if a veil had been lifted. They were unaware of how much their concentrations and thought processes were impaired.

The Pearl Producers Association is installing a chamber at the Broome District Hospital and a training course for the staff has been conducted by our Unit. We will be able to provide further support when the chamber is commissioned. The Broome chamber will provide a significant improvement in diver support in the North West of the State and will reduce the need to transport injured divers over 1,200 km to chamber facilities in Perth.

Conclusion

The Hyperbaric Medicine Unit at the Fremantle Hospital is providing a valuable service to the West Australian community. Apart from treating divers and many other medical and surgical conditions the Unit has conducted courses for hyperbaric nurses, doctors, Commercial Diving

Supervisors, chamber attendants and for a group of pearl divers learning to operate their own chamber. There are frequent visits by diving clubs and other interested groups. SPUMS members visiting Western Australia are invited to contact the Unit and inspect the facilities.

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Dr David Davies presented a paper on the clinical cases treated in 1990 at the Fremantle Hospital Hyperbaric Unit at the 1991 Annual Scientific Meeting. This will appear in a later issue.

THE DIVING MEDICAL AND REASONS FOR FAILURE

John Parker

Introduction

This is one medical practitioner's review of two hundred consecutive sports diving medical failures in an attempt to detail why divers fail the medical assessment.

The divers

The majority of the divers were young international tourists travelling through North Queensland to dive on and experience the Great Barrier Reef. The average age was twenty five (Table 1). Twelve hundred (59%) of the divers were male and 851 (41%) were female.

TABLE 1

AGE DISTRIBUTION	
<20 years	9%
20-29	78%
30-39	10%
40+	3%

The medical

Every diver filled in a full questionnaire, as described

in Australian Standard 2299 diving medical form,¹ and had a full diving examination.

Spirometry involving the measurement of the forced vital capacity (FVC) and the forced expiratory volume in one second (FEV₁) was performed. Any diver with abnormal respiratory function was given 5 mg nebulised salbutamol and retested. The urine was tested for proteinuria and glycosuria.

A chest X-ray was taken if there was a personal history of lung disease, serious lung infection or recurrent lung infection, a family history of tuberculosis, a suspicious occupational history, a history of mechanical ventilation of the lungs, and any abnormality found on clinical examination of the respiratory system or poor lung function test results.

A resting electrocardiogram was performed on all divers aged 45 years or over.

An air conduction audiogram was performed on all divers with a history of reduced hearing, clinical evidence of poor hearing or a clinically abnormal tympanic membrane.

All female divers were asked if they were late for their menstrual period and if pregnancy was possible. If so a pregnancy test was performed.

The results of the first 1,000 medicals have previously been published.²

Results

The 200 diving medical failures were extracted from 2,051 consecutive initial sports diving medical examinations giving an overall failure rate of 10% (Table 2). One hundred and forty three (71%) of the failures were classed as permanent failures, i.e. the person should never scuba dive, and 57 (29%) were classed as provisional, i.e. the reason failure was potentially remediable, or further investigation might reveal the reason of failure to be invalid. Of the 200 divers who failed 181 (91%) had only one reason for failure, 17 (8%) had two reasons for failure and 2 (1%) had three reasons for failure. A total of 221 reasons for failure were identified.

Discussion

The reasons for diving medical failures are numerous. Forty seven different reasons for failing a sports diving medical were found in this series but this cannot be claimed to be exhaustive. There is still need for the compilation of a handbook to guide doctors undertaking diving medicals as specific indications and cut off points for failure or need of

TABLE 2

REASONS FOR FAILURE

RESPIRATORY	
Asthma	88
Lower respiratory tract infection	12 *
Poor lung function (no obvious reason)	11 *
Pneumothorax traumatic	6
spontaneous	3
Previous chest surgery	3
Pleural adhesions	2
Pulmonary cyst	1
Sarcoidosis	1
Congenital aplasia of the lung	1
ENT.	
Non-patent eustachian tubes	13 *
Severe scarring of tympanic membrane	12
Upper respiratory tract infection	9 *
Deafness	7
Impacted wax in external ear canal	6 *
Otitis media	3 *
Middle ear effusion	3 *
Abnormal sinuses	3
Active hayfever	3 *
Infected wisdom tooth	1 *
Perforated tympanic membrane	1 *
Sinusitis	1 *
Sapedectomy	1
Tinnitus	1
CARDIOVASCULAR	
Arrhythmias	3 *
Hypertension	2 *
Anaemia	1 *
Aortic stenosis	1
Recent myocardial infarct	1
Ventricular septal defect	1
NEUROLOGICAL	
Epilepsy	2
Previous intracranial surgery	1
History of spinal cord injury	1
Migraine	1
DRUGS	
Bleomycin	1
Warfarin	1 *
OTHERS	
Diabetes	2
Severe caries	2 *
Severe herpes simplex infection of face	1 *
Pregnancy	1 *
Chronic active hepatitis	1
Anxiety state	1 *
Severe scoliosis limiting respiratory function	1
Inguinal hernia	1 *
Cold urticaria	1
Obesity	1 *

* = provisional

further investigation or opinion. Indications for diving fitness have too long been left to the physician's personal prejudice, resulting in a wide variation of views, which therefore gave little credibility in the diving industry.

Conclusion

In 2,051 diving medicals 221 reasons for failing diving medicals were recorded in 200 potential divers giving an overall failure rate of 10%. Forty seven different reasons for failing the diving medical have been listed. Nine percent of divers have more than one reason for failing. A handbook of specific indications and cut off points for failure, further investigation or referral should be compiled.

References

- 1 *Australian Standard AS 2299 - 1979 Underwater Air Breathing Operations*. North Sydney: Standards Association of Australia, 1979
- 2 Parker J. Review of 1,000 sports diving medicals. *SPUMS J* 1990; 20(2): 84-87

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THE ASSESSMENT OF THE PADI RESORT COURSE QUESTIONNAIRE

John Parker

Introduction

It is common practice for people undertaking scuba introductory or resort courses to go scuba diving without a diving medical, only completing a questionnaire on their health. The commonest diving instructor body undertaking resort courses in north Queensland is the Professional Association Diving Instructors (PADI). In the 1990 "PADI DISCOVER SCUBA AND INTRODUCTORY COURSE STATEMENT" sixteen questions are asked, preceded by the statement in bold letters "**If any (1-16) of these items do apply we regret that you must consult a physician prior to partaking in a scuba experience**". I used the information given in the Australian Standard AS2299 question-

naire¹, from 2,051 consecutive initial sports diving medicals, to complete an introductory course questionnaire for each diver to assess the efficacy of the resort course questionnaire.

Method

From the information given in their AS2299 diving medical questionnaire (and only that information) I completed the PADI course statement for all 2,051 divers. The questions appear in Table 1.

Results

Of the 2,051 divers 673 (33%) failed the resort course questionnaire and should have consulted a physician. Of these 673 divers only 142 (7%) actually failed the full diving medical I performed. Ironically only 106 (5%) failed the medical for the actual reason shown on the PADI questionnaire, the rest having problems not identified by the questionnaire. Hence the questionnaire only predicted 53% on the actual failures. See Table 2.

Discussion

The resort course questionnaire predicted 53% of failures compared to the AS2299 diving medical questionnaire which, when combined with an interview, predicted 63% of failures.² Questionnaires alone are therefore not a good predictor of diving fitness.

Discussion with local diving operators indicate that very few divers actually fail the resort course questionnaire. Certainly in 10 years of diving medical practice I have not had many divers referred for failing their resort course questionnaire. This may indicate that:

- 1 The diver, being warned that ticking a box in the questionnaire requires them to have a full diving medical with its additional cost and inconvenience, is encouraged to answer falsely.
- 2 The requirement of only having to indicate in the affirmative encourages people to miss things out. Having to state either a "yes" or "no" is more discriminating.
- 3 People are more honest in questionnaires when they know it will be followed by an interview.
- 4 Diving instructors make medical judgements on the questionnaire and override the statement that any positive response must eventuate in a physician's consultation.
- 5 I exaggerated their medical conditions in my comple-