

A FEASIBILITY STUDY INTO THE TEACHING OF
PARAPLEGICS TO DIVE IN THE POOL AND OPEN
OCEAN ON SCUBA

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This study concerns the training of two disabled males, both paraplegics, one T5 and the other T8, in both snorkel and scuba diving.

The course involved theory training to a level required for certification as a basic Scuba Diver under the National Qualification Scheme, and practical pool sessions. An open ocean dive was successfully completed, at 15 metres depth for 45 minutes, 5 kilometres off the South Queensland coast at Mooloolaba. This study has been conducted in an area in which not a great deal of research has been carried out. The guidelines for course organisation and content were established through discussion with fellow divers and instructors on diving. Also much direction was obtained from a paper entitled "Training Paraplegics and double amputees to dive in the sea with scuba" by NC Fleming and Y Melamed.(1)

This project has been conducted as an open ended exercise, with the intention of following up, in the near future, with further research aimed at developing training guidelines for diving courses for the disabled, and eventually, the possibility of certification for disabled divers, who cannot meet the present practical standards as set down by the Australian National Qualification Scheme, and other recognized diving associations. A training programme for instructors to teach the disabled to dive will also be developed in the future. The ability of disabled divers to rescue and resuscitate another diver will also be examined.

While being of great value to all individuals sport and recreation is perhaps of even greater value to the disabled, providing scope for physical rehabilitation and remediation, apart from the universal benefits of providing enjoyment, and satisfaction, and in many cases, settings for desirable and necessary social interaction, and integration.

Scuba diving for disabled people is a relatively new field of endeavour, but certainly one that is eminently feasible, and practicable. Courses in scuba diving for the disabled have been run successfully in the past, notably by Fleming and Melamed in Israel, which have resulted in a small number of isolated courses scattered throughout the world.

The positive benefit to be obtained by placing disabled persons in an environment in which their physical disability almost becomes of less consequence, would point to the need for many more courses of this type to be initiated, and much more thought is required by able bodied divers, dive clubs, and associations in making provision for disabled persons who may wish to enter into the sport and participate regularly in diving.

The medical and physiological requirements for the participants were taken from Fleming and Melamed (1) and are reproduced below:-

"The examination included a precise medical history plus a description of the present physical status, as well as the character of the applicant as far as it could possibly be judged. With regard to disabled divers, all the factors mentioned above were taken into consideration, plus the eight following special points:-

1. The respiratory system should be completely normal. All the respiratory muscles should be under control, and the spinal lesion not above T5, preferably not above T8.
2. It is of extreme importance that the skin condition of the paraplegic is proper without injury or pressure sores. For amputees the scars should be completely healed or perfect, meaning at least three months after amputations.
3. The paraplegic should not have any urinary tract infection, and should have full control of urine and bowel movements, with or without artificial aids.
4. Fullest consideration should be given to the personality of the disabled person. He should show self-discipline, with a full knowledge of his own abilities and disabilities. He should be of steady character with the capability of withstanding anxiety and panic. He should also be of a co-operative nature, accepting orders from his superiors without resentment.
5. He should be an excellent swimmer, participating regularly in intensive swimming, including sea swimming.
6. He should pass physical tests and exercises concerned in preparation for the course, and if necessary undergo special physio-therapeutical training.
7. If he is a paraplegic, his disability should not have been caused by a spinal bend (discussion below), nor by arteriovascular malformation, nor by transverse myelitis.
8. It should be pointed out to persons with partial spinal lesions, from whatever cause, that there is a possibility that diving might make the lesion complete. There is no record of this ever having happened other than with bends cases, but it is a possibility. There are several cases of people with partial traumatological lesions diving with no ill effect."

DETAILS OF THE TRAINEES

A.	
Date of birth:	1946
Date of injury:	8/4/1977
Type of injury:	Motor vehicle accident. Spinal fracture T4, complete paraplegia below T5.
Treatment:	Bed rest for 8 weeks. Mobilisation in a wheel chair and rehabilitation in the Spinal Injuries unit of the P A Hospital.

Status after treatment: No neurological recovery. Fully independent in a wheel chair.

Medical history: No previous medical or surgical history.

Present physical status: Blood pressure - 120/80
Pulse - 72
Chest - without pathological finding
Chest X-ray - clear
Neurological - paralysed below T8.

Lung data: Forced vital capacity (FVC) - 3.81
Forced expiratory volume in 1 second (FEV 1) - 3.321
FEV 1/FVC - 87%

A. passed the course successfully and performed all the exercises to the satisfaction of the instructors. He overcame initial respiration problems experienced when water entered his air ways, this was due to much reduced intercostal muscle use.

B.

Date of birth: 1956
Date of injury: 23/9/1978
Type of injury: Motor cycle accident resulting in a traumatic aortic aneurism which has resulted in an incomplete paraplegia below T8.

Treatment: Operation. Surgical repair of aorta followed by rehabilitation in the Spinal Injuries Unit of the P A Hospital.

Status after treatment: No neurological recovery. Independent in a wheel chair.

Medical history: No previous medical or surgical history.

Present physical status: Blood pressure - 140/80
Pulse - 84
Chest - without pathological finding
Chest X-ray - clear
Neurological - paralysed below T8.

Lung data: FEV - 5.11
FEV1 - 4.1
FEV1/FVC - 78%

B. passed the course of training successfully, and performed all the exercises to the satisfaction of the instructors.

Both candidates were elated at their open ocean diving success. They described a new confidence in the water and a readiness to try other aquatic activities now the fear of drowning had been overcome. Being able to use scuba and breath hold dive under the water acted as an "overkill" for previous fear of water. Now boating and fishing no longer embargoed by the fear of drowning. Both are keen to try subaquatic activities such as photography and marine biology. The social and environmental interactions were positive and important adjuncts to learning to dive. Future studies should assess improvements in self esteem.

This particular course of diving instruction had two main aims.

1. To acquaint the candidates with the theory necessary for safe diving, and also to train them in the practical aspects of scuba required for safe diving in enclosed swimming pools and in the open sea.
2. To integrate the course candidates, if possible, into able bodied dive clubs, and groups, to enable them to participate in the sport in the future. This second aim requires the training of supervisors for disabled divers as well as instructors to teach the disabled to dive. The Australian Underwater Federation (Queensland Branch) (AUFQ) club system and the Federation of Australian Underwater Instructors (FAUI) can play an important role to achieve these aims.

REFERENCE

1. Fleming NC and Melamed Y. Report of SCUBA diving training course for paraplegics and double leg amputees with an assessment of physiological and rehabilitation factors. *SPUMS J.* Jan-March 1977; 7(1): 19-34.

Another course for paraplegics will begin in December 1982 at the Cotton Tree pool, Maroochydore. At the time of writing, one totally blind male, one partially sighted male and one visually handicapped female are being trained.

An expanded version of this paper is available from the authors.

LETTERS TO THE EDITOR

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CANADA

25 October 1982

Dear Sir

In March of this year, a very enthusiastic group of five wheelchair athletes decided to learn to scuba dive. The group consisted of one left lower extremity poliomyelitic and four paraplegics, ranging from T2, a complete and an incomplete T5, and a T12. The complete T5 paraplegic had not participated in any sports activities since his accident, however, the other four were very active in all