

# Comparative Data from 2250 Male and Female Sports Divers: Diving Patterns and Decompression Sickness

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**Background:** The aim of the study was to compare the diving habits and histories of men and women in recreational scuba diving. **Methods:** More than 10,000 questionnaires were circulated to recreational divers in the United Kingdom. Retrospective, broad-based information was requested concerning general health, smoking, alcohol, recreational drug use, diving habits and histories, and physician-confirmed and self-diagnosed episodes of decompression sickness (DCS). Data relating only to women were also gathered. Questionnaires were anonymous. **Results:** Over four years, 2250 divers responded, 47% of whom were women. Of the 458,827 dives reported, 31% were by women. Differences in diving habits were observed between men and women, which included number of dives per annum, maximum depths dived, and dives with extra stops. When the level of experience was taken into account in this study group, the estimated rate of DCS in men was 2.60 times greater than for women. **Conclusions:** In this study, comparison between men and women in recreational diving differed from the initial evaluation when underlying factors were taken into account. Future studies should attempt to control for underlying factors in the data gathering and data analysis.

**Keywords:** gender, scuba diving, female, decompression sickness, menstruation.

THERE HAVE BEEN FEW broad-based studies to evaluate potential differences between men and women in recreational scuba diving (1,9). Some studies have suggested that women may be more susceptible to DCS than men (1,2,3,21), while other studies have found no gender difference (5,6,7,9,20,23). Results, therefore, are conflicting and controversial (17). One possible source of confusion is that past studies have not taken into account gender differences in diving habits (1). Studies have also suggested that there may be a relationship between the incidence of DCS and the phase in the menstrual cycle (3,5,12,18), with some studies also intimating a relationship between the oral contraceptive pill and DCS (1,4,19). To date there has been no organized attempt to collect data with regard to the menstrual cycle and the diving habits of women. With controversy surrounding these issues, a workshop sponsored by the Undersea and Hyperbaric Medical Society (UHMS) in 1986 suggested the need for further data collection (8).

This study was initiated to gather retrospective data pertaining to any differences in diving habits and histories between the genders, to explore the effects of

those differences on the incidence of DCS, and to compile an information resource which might assist in the future development of prospective data collection.

## METHODS

Between 1990 and 1994, the Diving Diseases Research Center (DDRC) distributed 10,560 eight-page, anonymous questionnaires to recreational divers in the United Kingdom via dive clubs, lecture tours, dive shows, and medical referees (diving medicine physicians). The information requested was broad-based and retrospective, pertaining to general health, smoking, alcohol, recreational drug use, and diving habits and histories. The respondents indicated whether the dives were logged or estimated. Women were asked menstrual history detail, contraceptive methods, and if they had dived while pregnant. Data from physician-diagnosed and self-diagnosed incidents of DCS were also gathered. Signs and symptoms of DCS were classified into five categories (fatigue, rashes/itches, pain only, tingling/numbness, weakness/paralysis). Diving practices at the time of the incident were also requested. Free-form response was encouraged where replies were not suited to fixed-option responses. No incentive was offered to encourage response to the project. Divers were asked to report on diving experience in blocks of up to 5 yr. Data from the questionnaires were transferred to a DataFlex database (developed specifically for this purpose) by two trained data entry technicians. Quality assessment was conducted, with the principal investigator scrutinizing 100% of all the maximal depths entered, the records of DCS incidents (both physician-confirmed and self-diagnosed), and dives during pregnancy, and where other health comments were received. Random checks were conducted of the re-

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