CUHMA ACMHS
Canadian Undersea and Hyperbaric Medical Association
Association Canadienne de Médecine Hyperbare et Subaquatique

E-NEWS

EDITOR'S NOTE – May 2025

The E-News is the monthly newsletter of CUHMA, the primary outlet to share news/announcements, upcoming events, abstracts of recent publications, job postings, professional perspectives, and images of relevant professional scenes. Submission of applicable content is welcome. New issues are released on the last business day of each month. Past issues are available at https://cuhma.ca. Direct correspondence to info@cuhma.ca.

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NEWS/ANNOUNCEMENTS

NOAA Oxygen Toxicity Limits Revision

The US National Oceanic and Atmospheric Administration (NOAA) established the central nervous system oxygen toxicity exposures limits table in 1991 (NOAA 2013). The table was informed by US Navy data, primarily in the PO_2 range ≥1.6 atm, with additional consideration of pulmonary toxicity concerns most relevant for longer exposures at lower PO_2s. The table was imperfect, but represented the best guidance for an uncertain risk profile with no reliable test to screen for oxygen tolerance. NOAA organized a panel workshop in March 2025, in conjunction with the American Academy of Underwater Sciences (AAUS) scientific meeting, to discuss the available data to determine if revision was warranted for the 1.3 atm PO_2, a high setpoint commonly used in rebreathers. The discussion considered community experience and relevant research data. The panel concluded that it is appropriate to increase the allowable duration limit from 3 h to 8 h (specifically 4 h work + 4 h rest). There was no attempt to recreate the progressive form of the original NOAA table, but the 1.3 atm change would effectively increase the duration limits for all PO_2s from 1.3 to 0.8 atm. There was no change recommended for PO_2s >1.3 atm, effectively discouraging prolonged exposures in this range. Formal publication of the findings is forthcoming.

References

Dinsmore DA, Bozanic JE. NOAA Diving Manual: Diving for Science and Technology, 5th ed. Best Publishing Company, June 2013.

UPCOMING EVENTS

AsMA-UHMS Joint Scientific Meeting 2025

The joint scientific meeting of the Aerospace Medical Association and the Undersea and Hyperbaric Medical Society will be held June 01-06 at the Hyatt Regency Hotel in Atlanta, GA. For more information, visit: https://www.asma.org/scientific-meetings/asma-annual-scientific-meeting/2025-asma-uhms-annual-scientific-meeting.

ICHF Biennial Congress 2025

The International de Centres Hyperbares Francophones organization represents 40 French hyperbaric units located around the world. The ICHF conference is a biennial event, with the fourth installment held June 08-10 in Quebec, QC. Workshops will be held at Hotel-Dieu de Levis and the main conference events in Vieux Quebec. For details: https://association-ichf.org/4ieme-congres-ichf-quebec-2025.

EUBS Annual Scientific Meeting 2025

The annual scientific meeting of the European Underwater and Baromedical Society will be held September 02-06 in Helsinki, Finland. Information will be posted on the dedicated conference website: www.eubs2025.com.

Canadian Association of Wilderness Medicine 2025

CAWM is a non-profit organization with the goal of connecting Canadian practitioners and researchers with an interest in wilderness medicine, and in promoting the field as an area of focus and specialization. The sixth annual conference - Prepared for the Unpredictable: Advancing Medicine in the Wild - will be held October 03-05 in Canmore, AB and virtually in a hybrid format. Visit: https://cawm.ca/cawm2025-2.

Brazilian Congress of Hyperbaric Medicine 2025

The 2nd Brazilian Congress of Hyperbaric Medicine will be held October 16-18 at the Hotel Laghetto Viverone in the Serra Gaúcha region of Brazil. The conference will address six main areas: maritime medicine, diving, hyperbaric oxygen therapy, safety in maritime environments, safety in hyperbaric environments, and wound care. Details coming soon.

RECENT PUBLICATIONS

Blatteau J-E, Gempp E. Fit for diving after musculoskeletal decompression sickness: how to detect and manage bone lesions? Undersea Hyperb Med. 2025 First Quarter;52(1):9-14. PMID: 40249717.

Musculoskeletal decompression sickness (MS DCS) is a clinical condition characterized by joint pain following scuba diving. Recent studies have shown a potential link between MS DCS and bone lesions, including dysbaric osteonecrosis. This article highlights the importance of early detection and management of bone damage in MS DCS patients. It is recommended that a specialist diving doctor be consulted for a comprehensive assessment to ensure an accurate diagnosis and treatment plan. Ordering a joint MRI two months after the accident is the best way to detect the presence of intraosseous edema, the main risk of which is osteonecrosis, especially if the humeral or femoral head is involved. This clinical communication highlights the need for caution when resuming diving activities after MS DCS involving the shoulder or hip, as bone involvement may complicate recovery. Hyperbaric oxygen therapy sessions have been shown to have an anti-edematous effect, which can be beneficial in accelerating intraosseous healing and limiting the risk of progression to osteonecrosis. Overall, this article underscores the critical role of the diving physician in ensuring the safe return to diving for individuals recovering from MS DCS.

Kjellberg A, Hassler A, Boström E, El Gharbi S, Al-Ezerjawi S, Schening A, Fischer K, Kowalski JH, Rodriguez-Wallberg KA, Bruchfeld J, Ståhlberg M, Nygren-Bonnier M, Runold M, Lindholm P. Ten sessions of hyperbaric oxygen versus sham treatment in patients with long covid (HOT-LoCO): a randomised, placebo-controlled, double-blind, phase II trial. BMJ Open. 2025 Apr 14;15(4):e094386. doi: 10.1136/bmjopen-2024-094386.

Objectives: To evaluate if 10 sessions of hyperbaric oxygen treatments (HBOTs) improve short- and long-term health related quality of life, symptoms and physical performance in long covid patients compared with placebo. Design: Parallel, randomised, placebo-controlled, double-blind trial. Setting: Single-centre, university hospital, Sweden. Participants: Previously healthy subjects aged 18-60 years, diagnosed with long covid were included. We excluded pregnant women, patients with RAND-36 (role limitations due to physical health (RP) and physical functioning (PF)) above 70, diabetes, hypertension and contraindications for HBOT. Interventions: Subjects were randomly assigned to 10 sessions of HBOT or sham (placebo) treatments over 6 weeks. HBOT involved 100% oxygen, 2.4 bar, 90 min, placebo medical air, 1.34-1.2 bar. Randomisation (1:1) was done electronically, in blocks stratified by sex and disease severity. Subjects and investigators were blinded to allocation. Primary and secondary outcome measures: Primary endpoints were changes from baseline in RAND-36 PF and RP at 13 weeks. Efficacy was analysed on an intention-to-treat basis. Harms were evaluated according to the actual treatment given. Results: Between 15 September 2021 and 20 June 2023, 80 subjects (65 women, 15 men) were enrolled and randomised (40 in each group). The trial is completed. The primary endpoint analysis included 79 subjects (40 in HBOT and 39 in control). At 13 weeks, both groups showed improvement, with no significant difference between HBOT and placebo in PF (least square mean difference between groups (LSD), 0.63 (95% CI -7.04 to 8.29), p=0.87) and RP (LSD, 2.35 (95% CI -5.95 to 10.66), p=0.57). Harms: 43 adverse events (AEs), most commonly cough and chest pain/discomfort, occurred in 19 subjects (49%) of the HBOT group and 38 AEs in 18 subjects (44%) of the placebo group, one serious AE in HBOT and one death in the placebo group. Conclusions: 10 HBOT sessions did not show more short-term benefits than placebo for long covid patients. Both groups improved, with a notable sex difference. HBOT has a favourable harm profile. Trial registration number: ClinicalTrials.gov (NCT04842448), EudraCT (2021-000764-30). The trial was funded by Vetenskapsrådet (2022-00834), Region Stockholm (2020-0731, 2022-0674), Hjärt-Lungfonden and OuraHealth Oy.

Moon RE, Mitchell SJ. Decompression sickness: current recommendations. Undersea Hyperb Med. 2025 First Quarter;52(1):55-64. PMID: 40249722.

Decompression sickness (DCS, "bends") is the clinical condition triggered by generation of bubbles in tissues or blood due to supersaturation of inert gas during or after a reduction in ambient pressure. The condition can occur in association with compressed gas diving, compressed air ("caisson") work or rapid decompression to high altitude or reduced cabin pressure such as extravehicular activity (EVA) in space suits. It can also be triggered by mild reduction in ambient pressure such as during commercial aircraft flight after scuba diving. Its manifestations range from joint or muscle pain, lymphedema and skin rash to severe neurological abnormalities and cardiorespiratory collapse. Immediate evaluation should include a history of the diving/altitude event and timing of symptom onset, in addition to a careful neurological exam. Immediate treatment should include oxygen administration and appropriate resuscitation with oral or intravenous fluids; definitive treatment of DCS consists of hyperbaric oxygen. While residual manifestations may persist in severe instances, in most cases appropriate treatment results in good outcome.

Moon RE, Mitchell SJ. Hyperbaric treatment of air or gas embolism: current recommendations. Undersea Hyperb Med. 2025 First Quarter;52(1):41-53. PMID: 40249721.

Gas can enter arteries (arterial gas embolism) due to alveolar-capillary disruption (caused by pulmonary overpressurization, eg, breath-hold ascent by divers), veins (venous gas embolism, VGE) as a result of tissue bubble formation due to decompression (diving, altitude exposure), or during certain surgical procedures where capillary hydrostatic pressure at the incision site is subatmospheric. Both AGE and VGE can be caused by iatrogenic gas injection. AGE usually produces stroke-like manifestations, such as impaired consciousness, confusion, seizures, and focal neurological deficits. Small amounts of VGE are often tolerated due to filtration by pulmonary capillaries; however, VGE can cause pulmonary edema, cardiac "vapor lock," and AGE due to transpulmonary passage or right-to-left shunt through a patent foramen ovale. Intravascular gas can cause arterial obstruction or endothelial damage and secondary vasospasm and capillary leak. Vascular gas is frequently not visible with radiographic imaging, which should not be used to exclude the diagnosis of AGE. Isolated VGE usually requires no treatment. AGE treatment is similar to decompression sickness (DCS), with first aid oxygen followed by hyperbaric oxygen. Although cerebral AGE (CAGE) often causes intracranial hypertension, animal studies have failed to demonstrate a benefit of induced hypocapnia. An evidence-based review of adjunctive therapies is presented.

Möring MM, Valkenburg AC, Schuur-Van't Hof N, van Beekhuizen HJ, Lansdorp CA. Reduced symptoms of late radiation tissue injury of the vagina after treatment with hyperbaric oxygen therapy: a retrospective analysis of 19 patients. Gynecol Oncol. 2025 Apr 22:197:27-33. doi: 10.1016/j.ygyno.2025.04.003. Online ahead of print.

Introduction: Hyperbaric oxygen therapy (HBOT) is a well-established treatment for late radiation tissue injury (LRTI) of the pelvis, such as radiation-cystitis and -proctitis, but not for LRTI of the vagina. This study aims to describe the outcomes of patients with vaginal symptoms after HBOT. Methods: The records of all patients with LRTI of the vagina, referred for HBOT from a tertiary hospital, between 2010 and 2020 were retrospectively analyzed. Patients with a non-vaginal primary complaint, fistulas, or incomplete HBOT treatment (<20 sessions) were excluded. Outcomes included patient- and physician-reported symptoms (such as dyspareunia, dryness, bleeding, and anatomical changes) and quality-of-life questionnaires. Outcomes were assessed at baseline, after HBOT, 3 months after HBOT, and during yearly follow-up. Responders were defined as patients with ≥1 vaginal symptoms improving after treatment. Results: 19 Patients (median age 42) received an average of 40 sessions of HBOT (80 min of 100% oxygen at 2.5 ATA). 15/19 patients (79%) were responders at the end of treatment (median of 3 symptoms improving). The symptoms most responsive to HBOT were ulceration (89 %), dyspareunia (82%), pain (71%), and changes in anatomy like stenosis or fibrosis (80%). Response was maintained during 3 month follow-up in 14/15 patients. No major adverse events of HBOT were reported. Conclusion: A majority of patients had a lasting improvement of vaginal complaints after HBOT in this study. Based on this study and the generic effects of HBOT in LRTI, HBOT should be considered as a treatment option for patients with ongoing complaints of the vagina due to LRTI.

Räisänen-Sokolowski A, Eede RV, Eede MV. Risk at work under pressure with medication- what do we know? Undersea Hyperb Med. 2025 First Quarter; 52(1):15-22. PMID: 40249718.

Medication has become an integral part of modern life, as well as in people working in hyperbaric conditions. However, our understanding of how drugs interact with pressure variations, gas compositions, physical exertion, and physiological changes in a hyperbaric environment is very limited. Firstly, the medical condition for which a medication is being taken must be evaluated in the context of fitness for occupational diving. Secondly, the desired or adverse effect of the medication needs to be evaluated in the context of occupational diving. Some potential adverse effects include changes in alertness and cardiovascular or pulmonary functions. These can affect the fitness to dive, increase the risk of decompression illness, or mimic its symptoms. Hence, special concern must be paid to medications affecting the cardiovascular, respiratory, and central nervous systems. The purpose of this work was to evaluate what is known about commonly used drugs in the setting of occupational diving. We found that most of the data available is either anecdotal or based on recreational diving and, therefore, needs to be cautiously adapted to the working environment.

van Ooij PJ, van Hulst RA. Respiratory fitness for occupational diving, what is new? Undersea Hyperb Med. 2025 First Quarter;52(1):33-40. PMID: 40249720.

Diving diseases originating from lung-related pathology are not the most prominent but are considered the most severe. To minimize this risk, a good respiratory tract assessment is important. Organizations like the British Thoracic Society (2003) and the European Diving Technology Committee (EDTC) (2004) have provided guidelines regarding this assessment. However, most of the guidelines are 20 years old. The EDTC has revised its guidelines based on the present literature and published it last year. This review discusses a few topics that have changed or are newly introduced in the new EDTC guidelines. Importantly, additional tests might be necessary when assessing the respiratory tract based on history taking and spirometry, leading to a case-by-case decision

regarding the fitness to dive. Particular attention should be paid to individuals with large lungs or cysts, those who have undergone thoracic surgery, and those with a history of asthma, immersion pulmonary edema, COVID-19 infection, or sleep apnea.

CUHMA-ACMHS is the Canadian voice for the advancement of hyperbaric and diving medicine throughout our country and beyond. Our activities include continuous medical education for physicians, nurses, respiratory therapists and anyone involved in the fields of hyperbaric and diving medicine. We are also promoting dissemination of clinical research, publishing position statements, liaising with related professional associations and government agencies. Our main goal is advocating on behalf of our patients. Our vision is to be the reference for the development and delivery of hyperbaric and diving medicine in Canada and beyond. Our mission is to promote excellence in hyperbaric and diving medicine through leadership in education, promotion of best practices and advocacy for our patients. Our values are excellence, leadership, collaboration, communication, and integrity.

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