

## E-NEWS

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](mailto:info@cuhma.ca).

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### NEWS/ANNOUNCEMENTS

#### Obituary - Michael F. Menduno



Credited with coining the term "technical diving," Michael ("M2") Menduno promoted technical diving for more than 35 years. First certified as a diver in 1976, he was founder and editor of *aquaCORPS* (1990-1996), a magazine dedicated to technical diving that played an important role in the early evolution. As a skilled and prolific writer, his journalistic productivity continued over the years, concluding with his service as editor-in-chief of *InDEPTH* magazine (2018-2025). He was also heavily involved in the organization of technical diving education events, most notably the Rebreather Forum series; from the first in 1993 through to RF4 in 2023. Known for his enthusiasm and positive nature, he was a friend to and supporter of many in the international diving world. Michael, age 73, passed away on October 03 as the consequence of a stroke suffered on September 02. For more on the life and times of Michael: <https://www.tdisdi.com/aquacorps/michael-menduno>

#### NOAA CNS Oxygen Toxicity Limits Revision

The US National Oceanic and Atmospheric Administration (NOAA) organized a panel workshop in conjunction with the American Academy of Underwater Sciences (AAUS) scientific meeting in March 2025 to review the available research evidence into central nervous system oxygen (CNS) toxicity at a PO<sub>2</sub> limit of 1.3 atm. The effort has resulted in a paper recommending an increase in the allowable limit from 3 h to 8 h (specifically, 4 h work + 4 h rest). This would effectively increase the duration limits for all PO<sub>2</sub>s from 1.3 to 0.8 atm. There was no change recommended for PO<sub>2</sub>s >1.3 atm, effectively discouraging prolonged exposures in this range. Pulmonary toxicity remains a concern to be managed, but as a normally reversible condition. The paper is now available for unrestricted, free download and sharing:

Hoyt J, Murphy FG, Pollock NW, Kernagis D, Bird N, Menduno M, Bright J, Mitchell SJ. Revised guideline for central nervous system oxygen toxicity exposure limits when using an inspired PO<sub>2</sub> of 1.3 atm. *Diving Hyperb Med.* 2025 Sep 30; 55(3): 228-36. doi: 10.28920/dhm55.3.228-236. PMID: 40986922.

<https://xray-mag.com/content/new-oxygen-exposure-limits-proposed>

#### Invitation to Participate in a Diving Safety Research Study

Djamdoudou Abdou Rahman, MD and Neal W. Pollock, PhD are conducting a research study focused on understanding diving incidents and identifying potential contributing factors. The project aims to gather insights and experiences from divers worldwide to assess and enhance the safety and well-being of the diving community. Support can be through participation and/or sharing the following survey link with any divers who may be interested.

The survey is voluntary and anonymous. It is expected to take 5 to 20 minutes to complete, depending on personal experience. Prerequisites include age ≥15 years, diving certification of any type, and an ability to complete the survey in English or French. Thank you in advance.

[https://questionnaire.simplesurvey.com/f/s/diving\\_incident\\_survey](https://questionnaire.simplesurvey.com/f/s/diving_incident_survey).

## UPCOMING EVENTS

### Canadian Underwater Conference 2026

The Diver Certification Board of Canada (DCBC) will hold the Canadian Underwater Conference & Exhibition March 24-26 at the Holiday Inn Toronto International Airport hotel. Visit: <https://www.underwaterconference.ca>.

### UMC Introductory Diving Medicine Course

Undersea Medicine Canada will offer a Level 1 'Introductory Course in Diving Medicine - Fitness to Dive' May 11-15 in Halifax, NS. An optional half-day pre-course will be held May 10 for those wanting additional preparation for the program. Upon successful completion of the course, physicians will qualify as CSA Z275.2-15 Level 1 Diving Medical Examiners and can have their names listed with the Diver Certification Board of Canada (DCBC) to conduct commercial diver medicals in Canada. This 40-h course has been accredited for 35 MAINPRO+ CME credits by the College of Family Physicians of Canada. The registration portal will open on January 15. Contact Dr. Debbie Pestell ([drdebl@ns.sympatico.ca](mailto:drdebl@ns.sympatico.ca); 902-225-8214) or visit: <https://underseamedicine.ca> for more information.

## RECENT PUBLICATIONS

**Andres C, Widmann L. Scuba diving of children: A global review. Arch Pediatr. 2025 Oct 6:S0929-693X(25)00186-1. doi: 10.1016/j.arcped.2025.06.007. Online ahead of print.**

Introduction: Scuba diving is becoming increasingly popular worldwide, including among children and adolescents. This activity carries risks and potential accidents. Differences in anatomy, psychology, and human physiology between adults and children must be considered, leading to specific recommendations for scuba diving for young people. Methods and results: Contra-indications should be known by the dive physician and in this article we compare recommendations of different countries, leading diving organizations (PADI (Professional Association of Diving Instructors) and SSI (Scuba Schools International)) to the French recommendations. The lack of homogeneous international recommendations and limited evidence-based data result in significantly different recommendations. Conclusion: It seems necessary to inform general practitioners and pediatricians, mostly without experience in diving medicine, about the key physiological effects of scuba diving and the main differences in physiology between adults and children or teenagers. This is essential to ensure proper medical examinations and certification.

**Babel S, Bosco G, Camporesi E. Efficacy and safety of hyperbaric oxygen therapy in ligament and tendon injuries: a systematic review. Eur J Transl Myol. 2025 Oct 1. doi: 10.4081/ejtm.2025.14016. Online ahead of print.**

Ligament and tendon injuries are one of the major health concerns that affect over 1.71 billion people around the world. They cause functional limitations and affect the quality of life of people. As conventional methods have their limitations, hyperbaric oxygen therapy (HBOT) is becoming a potential solution for the improvement and acceleration of the healing process in ligament and tendon injuries. This systematic review aims to evaluate efficacy and safety of Hyperbaric Oxygen Therapy (HBOT) for ligament and tendon injuries. This systematic review provides a comprehensive analysis by following PRISMA guidelines. We looked for articles published between March 1999 and May 2024 across 6 databases. The articles included investigated the use of hyperbaric oxygen therapy to treat ligament or tendon injuries. Animal studies, as well as human studies, were included in this review. Studies were evaluated for HBOT, and if they were not related or with insufficient data, they were excluded. Risk of bias has been assessed using the ROBINS-I tool. The studies measured outcomes across functional, histological, biomechanical, physicochemical, and even radiological aspects. A total of 13 studies were included in the review, with 693 participants. This study has analyzed the effectiveness of HBOT in two ways, namely, standalone treatment and combined methods like HBOT and other methods like platelet growth factor, steroid injections, intermittent oxygen therapy, or platelet-rich plasma. The pressure observed in this study is between 1.3 to 2.8 atmospheres absolute. The findings suggest that HBOT, whether used alone or as a complementary treatment, enhanced healing compared to controls. The ROBINS-I tool suggested low risk of bias for the majority of studies. Positive impacts in mechanical and histological outcomes were observed in both animal and human studies, such as increased collagen density, fiber alignment, and synthesis. The review highlights the potential of HBOT to especially reduce graft rejection post-ACL reconstruction, enhance functional recovery, and accelerate tendon healing. HBOT seems to be a safe and effective method for speeding up the healing process of tendons and ligaments. But, there is a need for more studies with more number of population for analyzing the effect of HBOT in a long run. It is necessary to make a standard protocol for the HBOT treatment method.

**Duani H, Bifano AS, Amâncio FF, Liu SM, Gomes LM, Macieira C, Navarro TP, Tupinambás U. Adjuvant hyperbaric oxygen therapy reduces the duration of sporotrichosis treatment. PLoS Negl Trop Dis. 2025 Oct 29;19(10):e0013659. doi: 10.1371/journal.pntd.0013659. Online ahead of print.**

Background: Sporotrichosis is a subcutaneous mycosis caused by *Sporothrix spp.*, typically acquired through traumatic inoculation of fungal spores from soil, plants and infected cat scratches. The disease manifests in various clinical forms, including lymphocutaneous, ocular, bone, and disseminated infections. Standard treatment relies on prolonged administration of antifungals such as itraconazole, terbinafine, and potassium iodide, often requiring months for complete resolution. Moreover, treatment challenges include slow clinical response, recurrence, and potential drug toxicity. Hyperbaric oxygen therapy has been investigated as a potential adjuvant for invasive fungal infections due to its antimicrobial properties, enhanced tissue oxygenation, and immunomodulatory effects, which may contribute to improved healing and therapeutic outcomes. Methods: Patients with a confirmed diagnosis of cutaneous/lymphocutaneous sporotrichosis were divided into two groups to receive either itraconazole or itraconazole plus hyperbaric oxygen therapy. The primary outcomes were time to cure and therapeutic response. The intervention group was assessed weekly through clinical parameters and photographic records, and the control group was assessed monthly. Results: Patients who received hyperbaric oxygen therapy experienced a much shorter healing time than those who did not. The average time until a cure was 208.53 days in the itraconazole group compared to 57.54 days in the itraconazole plus hyperbaric oxygen therapy group. Patients in the hyperbaric oxygen therapy group received an average of 18.23 hyperbaric sessions and were 65 times more likely to achieve faster healing than those who did not. Notably, with each additional year of age, the chances of rapid healing decreased by 2%. Conclusion: Our findings suggest that adjuvant hyperbaric oxygen therapy significantly accelerates the healing of fixed cutaneous/lymphocutaneous sporotrichosis. The results also highlight hyperbaric oxygen therapy's potential to enhance treatment efficacy and reduce the burden of prolonged antifungal therapy. These results support further investigation of this valuable adjunctive treatment in the management of sporotrichosis.

**El Hadji S, Teguh DN, Ridderikhof ML. Hyperbaric oxygen therapy for late radiation tissue toxicity injury after head and neck cancer: a systematic review of the literature. Radiat Oncol. 2025 Oct 3;20(1):149. doi: 10.1186/s13014-025-02680-1.**

Background: Head and neck cancer (HNC), most of which are squamous cell carcinomas, is the seventh most common cancer worldwide. Radiotherapy is a standard

treatment for HNC but may lead to late complications and severe complications like osteoradionecrosis (ORN) and impaired wound healing due to tissue hypoxia. Hyperbaric oxygen therapy (HBOT) has shown promise in ameliorating these late radiation effects. The purpose of this review is to summarize the extent of the literature on the effectiveness of HBOT in the treatment of late radiation tissue toxicity injuries (LRTTI) specifically in HNC patients. Methods/material and methods: A systematic literature search was performed using PubMed, Embase, and the Cochrane Library on August 12, 2024, including studies published between 2004 and 2022. Studies that included HNC patients with LRTTI and treated with HBOT were selected. Articles were critically appraised using the Joanna Briggs Institute (JBI) checklists. Data on patient characteristics, HBOT treatment details, and main outcomes were extracted. Primary outcomes assessed included clinical changes, such as the Notani score, while secondary outcomes focused on patient-reported measures such as VAS and OHIP. Descriptive analysis, supported by statistical measures, was used to interpret the results. Results: A total of 17 studies were reviewed, including 640 HNC patients with LRTTI who were treated with HBOT. In this systematic review, HBOT is presented in the included studies as a reliable and safe treatment for the treatment of LRTTI in HNC patients, with positive outcomes observed in 14 out of 17 studies. Specifically, almost all studies investigating ORN and oral health reported beneficial effects, with significant p-values in multiple cases. Overall, significant p-values were found in 11 studies, with a low incidence of adverse effects reported across the studies. Conclusion: This review suggests that HBOT may be effective in the treatment of LRTTI in HNC patients. However, the supporting evidence is mainly derived from low quality studies with a high risk of bias, limited sample sizes, and inconsistent outcome measures. Additional high-quality studies are needed to clarify the true clinical benefits and optimal use of HBOT.

**Hajjar R, Bews KA, Alaoui AA, Khan S, Gleason L, Sanchez E, Reynolds IS, Kane SV, Perry WR, Mathis KL, McKenna NP. Hyperbaric oxygen therapy in the management of refractory perianal Crohn's disease. J Clin Med. 2025 Sep 27;14(19):6843. doi: 10.3390/jcm14196843.**

Background: Crohn's disease (CD) is an inflammatory bowel disease (IBD) that is prevalent worldwide. It can affect any segment of the gastrointestinal tract, from the mouth to the anus. When CD affects the anus, perianal fistulizing disease develops. The management of perianal CD is challenging and may require morbid surgery when there is no response to medical therapy. The emergence of novel biologic therapies, namely tumor necrosis alpha (TNF- $\alpha$ ) inhibitors, has proven to provide long-term relief and prevent disease-related complications. Perianal CD is, however, refractory or recurrent in up to 80% of patients.

One of the reported options to manage perianal CD is hyperbaric oxygen therapy (HBOT), which aims at increasing tissue oxygen saturation in an attempt to promote repair and reverse local inflammation. Data on this approach is scant. Methods: A retrospective review was performed to identify patients with CD at the Mayo Clinic in Rochester who underwent HBOT for perianal disease between 2014 and 2023. Demographic and clinical data were reviewed, including the history of the disease, concomitant medical and surgical therapy and the need for fecal diversion. The HBOT regimen, including the number of sessions and clinical response, were reviewed. Results: Six patients aged from 19 to 60 years underwent HBOT for perianal CD. Two patients had a history of total proctocolectomy with ileal-anal pouch anastomosis (IPAA). All patients except one were on immunosuppressive medication including biologic agents. Four patients had fecal diversion with an ileostomy or colostomy. Patients received between 10 and 40 sessions of HBOT. Four patients reported symptomatic improvement. On physical examination and/or imaging assessment, improvement was noted in one patient. Progression of the perianal disease was noted in all other patients, with all except one requiring an operation in the following year. Conclusions: HBOT may provide symptomatic relief in some patients with refractory perianal CD, but data on its long-term efficacy remains limited.

**Iwashita Y, Yoshioka N, Murakami K, Mukoyama K, Sato R, Kodani N, Makiishi T. Cervical epidural abscess secondary to a post-traumatic hematoma, successfully treated with adjunctive hyperbaric oxygen therapy: a case report. J Clin Med. 2025 Oct 17;14(20):7346. doi: 10.3390/jcm14207346.**

Background: Spinal epidural abscess (SEA) is a rare but challenging disease. Hyperbaric oxygen therapy (HBOT) is used as an adjunctive therapy for SEA in a limited number of hospitals; however, its efficacy has not been well described. Case: A 70-year-old man presented at our hospital with cervical pain, fever, and impaired right shoulder movement. The patient fell after drinking 17 days prior to the presentation. He was diagnosed with an SEA secondary to a spinal epidural hematoma caused by a prior injury. The patient also had dental caries, and his blood culture was positive for *Streptococcus intermedius*. We diagnosed the patient with a spinal epidural abscess and hematoma that developed from the caries and the injury. Antibiotics were initiated; however, the motor function gradually worsened, and decompressive surgery was performed. After surgery, neurological impairment persisted, and HBOT was used as an adjunctive therapy. After initiating HBOT, the patient's arm movements improved, and he was referred to a rehabilitation hospital on day 110 for further rehabilitation. Conclusions: HBOT is increasingly used for spinal cord infections and injuries

in a limited number of institutions. It is a potentially effective adjunctive therapy for patients for whom antibiotics and surgery are ineffective.

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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