

E-NEWS

EDITOR'S NOTE – November 2023

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

CUHMA Member Profile Updates

All CUHMA members are asked to logon through the online portal (<https://cubhma.ca>) and ensure that member profile information is current, including address preferences for electronic communications.

UPCOMING EVENTS

GUE Diving Conference

The Global Underwater Exploration conference celebrating the 25th anniversary of the organization will be held November 10-11 in High Springs, FL. For more information visit: <https://www.gue.com/2023-conference>.

DEMA Show 2023

The Diving Equipment & Marketing Association (DEMA) show will be held November 14-17 at the Ernest N Morial Convention Center in New Orleans, LA. This is a popular industry event. Visit: <https://www.demashow.com>.

Ponza Rebreather Conference

The eighth iteration of the Ponza Rebreather Conference will be held May 8-12, 2024 on the island of Ponza, Italy (south of Rome and west of Naples in the Tyrrhenian Sea). An international roster of speakers will present to an enthusiastic cadre of technical divers. Each day will include lectures and boat dives organized by the Ponza Diving Center. Space is limited. For more information visit: www.ponzadiving.com or info@ponzadiving.com.

UMC Level 2 Advanced Diving Medicine Course

Undersea Medicine Canada is offering a CSA Z275 Level 2 'Advanced Course in Diving Medicine: Diagnosis and Treatment.' This 6-day course will be held May 20-25, 2024 at the Atlantic Commercial Diving Centre in Summerside, PEI. Augmenting classroom instruction and case-based learning, site visits will allow observation of commercial diver training, diving, and hyperbaric chamber operations. A CSA Z275.2-15 Level 1 course or equivalent training is a prerequisite for this 45-h program. Find more information at <https://underseamedicine.ca> or contact Dr. Debbie Pestell at drdebl@ns.sympatico.ca or 902-225-8214.

UHMS Annual Scientific Meeting

The annual scientific meeting of the Undersea and Hyperbaric Medical Association will be held June 12-15, 2024 in French Quarter of New Orleans. Visit: <https://www.uhms.org/education/annual-scientific-meeting/asm-registration.html#read-bio>.

RECENT PUBLICATIONS

Brebeck AK, Huber H, Schipke JD, Grehn F, Haritoglou C, Klink T. [Tonometry and pachymetry to evaluate fluctuations of intraocular pressure in the context of scuba diving]. *Ophthalmologie*. 2023 Oct 27.

Background: It is currently still not clarified whether diving using a self-contained breathing apparatus (scuba) is associated with intraocular pressure (IOP) fluctuations of clinical relevance and whether intensive diving could exacerbate the damage in glaucoma patients. Objective: This study aimed to evaluate the effect of scuba diving on IOP in healthy volunteers without prior eye injuries or surgery. Hypothesis: recreational diving does not lead to significant increases or fluctuations of the IOP. Material and methods: The study included 16 divers (5 female) who performed a total of 96 dives with air or nitrox32 to a depth of 20-30 m for an average of 50 min. The central cornea thickness was measured using ultrasonic pachymetry Pocket IITM (Quantel Medical Pocket IITM, Quantel Medical, Clermont-Ferrand, France), and the IOP was measured using an Icare® PRO (Icare® PRO, Icare Finland Oy, Espoo, Finland) directly before the dive and 10 min after surfacing. Results: All data refer to the right eye. Average IOP values ranged from 15.6 to 19.2 mm Hg pre-dive and 16.8 to 18.2 mm Hg post-dive. The range of

IOP values was 2.2-11.5 mm Hg pre-dive ($\Delta = 9.3$ mm Hg) and 2.7-14.8 mm Hg post-dive ($\Delta = 12.1$ mm Hg). Of the divers 11.5% vs. 18.8% had increased IOP values >21 mm Hg (pre-dive vs. post-dive). Conclusion: This study found no significant differences in IOP values between pre-dive and post-dive measurements in healthy SCUBA divers. Therefore, recreational scuba diving is unlikely to affect the IOP in healthy individuals.

Féral J-P, Norro A. Specific initial training standards are needed to dive for science in Europe, occupational vs. citizen science diving. Front. Mar. Sci. 10:1134494.

Today, collaboration between scientific research and civil society is growing significantly. The general public's curiosity drives it to engage with the scientific process and culture and in the search for solutions to complex issues (economic, social, health, environmental, cultural, educational, or ethical). Clarification is needed to differentiate between occupational scientific activity and citizen-based science. They do not require the same scientific and technical skills despite using similar equipment and their legal and administrative frameworks being totally different. The confusion created by the indiscriminate use of the same term "scientific diving" to refer to different training courses and activities compromises the quality of existing occupational standards and, ultimately, has a negative impact on the safety of the activity at work. A clear definition of Citizen Scientific Diving and Occupational Scientific Diving makes it possible to differentiate between the objectives and target groups of these two activities and their legal framework. There is a need to establish an accepted and shared standard in the occupational field and to ensure the mobility of scientists. A long process undertaken by a motivated scientific community (late 1980s-2000s) led to the establishment of European initial training standards for Occupational Scientific Diving through the ESDP-European Scientific Diving Panel (firstly under the aegis of the European Marine Board, now of the MARS-European marine stations network). The quality and general acceptance of these standards by a large part of the European scientific community have already adopted them in the occupational health and safety legislation of seven European countries (Belgium, Finland, France, Germany, Norway, Sweden, and the UK in 2023). Adopting them in other countries' health and safety legislation is still desirable. This will increase their recognition, acceptance and use for the benefit of scientific work. Building bridges between academic science and non-academic citizen science is possible and this is done by developing coherent projects that produce results that benefit both science and society. While distinguishing between the two, as an added value, this approach could better guide the recreational diving training sector in developing a new market.

Muroya D, Nadayoshi S, Yamada K, Kai Y, Masuda N, Nishida T, Shimokobe M, Hisaka T. Effects of hyperbaric oxygen therapy for *Clostridioides difficile*-associated colitis: a retrospective study. J Anus Rectum Colon. 2023; 7(4): 264-72.

Objectives: *Clostridioides difficile* (CD) is an anaerobic spore-forming Gram-positive rod that is a major cause of antibiotic-associated diarrhea. Hyperbaric oxygen therapy (HBO) is a well-established treatment for *C. perfringens*, but there are no reports that have examined the efficacy of HBO against CD, which is also an anaerobic bacterium. Methods: In this study, we retrospectively examined whether HBO therapy affects the prognosis following CD infections (CDI). This study included 92 inpatients diagnosed with CDI at our hospital between January 2013 and December 2022. Of these, 16 patients received HBO therapy. The indications for HBO therapy were stroke in five patients, ileus in four patients, cancer in two patients, acute peripheral circulatory disturbance in two patients, and others in three patients. The mean observation period was 5.4 years. Results: In the univariate analysis, there was no significant difference in severity, mortality, hospitalization, or overall survival between patients who did and did not receive HBO therapy. However, the HBO group had a significantly lower recurrence rate (0% vs. 22.4%, $p=0.0363$) and a shorter symptomatic period (6.2 vs. 13.6 days, $p=0.0217$). Conclusions: HBO may have beneficial effect on CDI by shortening the symptomatic period and preventing recurrence.

Ohira S, Komori M, Tsuna Y, Nakamura M, Yamaguchi Y, Matsuura K, Osafune H, Wada K. Indications of effective hyperbaric oxygen therapy combined with steroid therapy for sudden hearing loss. Otol Neurotol. 2023 Oct 19.

Objective: This study evaluated the therapeutic effect of hyperbaric oxygen therapy (HBOT) combined with steroid therapy to treat sudden hearing loss and examined the index associated with excellent therapeutic effect. Methods: We included 109 patients with sudden hearing loss. Patients were divided into the HBOT combination group (59 sides) treated with HBOT and steroid therapy and HBOT noncombination group (50 sides) involving steroid therapy only. The recovery rate of each group was compared according to the severity of hearing loss. Blood samples were evaluated and inflammatory markers, such as neutrophil-lymphocyte ratio (NLR) and platelet-lymphocyte ratio (PLR), were calculated and compared by severity. We evaluated the usefulness of inflammatory markers for predicting recovery rate, and calculated cutoff values. Results: The HBOT combination group exhibited a higher overall recovery rate than the HBOT noncombination group, particularly in severe cases. However, there was no significant difference in the severity of hearing loss based on various inflammatory markers. NLR and PLR are useful for predicting the effect

in patients treated with concomitant HBOT. By setting 2.43 and 146.67 as cutoff values for NLR and PLR, respectively, we observed that lower values resulted in better recovery rates. Conclusion: The use of HBOT is effective for severe cases and early blood flow disorders with low NLR and PLR and less inflammation. When determining treatment, not only should the severity of hearing loss be considered, but also the NLR and PLR should be evaluated and examined based on cutoff values.

Vrdoljak D, Foretić N, Drviš I, Ivančev V, Perić M, Dujčić Z. Do freedivers and spearfishermen differ in local muscle oxygen saturation and anaerobic power? J Sports Med Phys Fitness. 2023 Oct 30.

Background: Freediving is defined as an activity where athletes repetitively dive and are exposed to long efforts with limited oxygen consumption. Therefore, anaerobic features are expected to be an important facet of diving performance. This study aimed to investigate differences in anaerobic capacity and local muscle oxygenation in spearfisherman and freedivers. Methods: The sample of participants included 17 male athletes (nine freedivers, and eight spearfishermen), with an average age of 37.0±8.8 years, training experience of 10.6±9.5 years, body mass of 82.5±9.5 kg and height of 184.2±5.7 cm. Anthropometric characteristics included: body mass, body height, seated height, and body fat percentage. Wingate anaerobic test was conducted, during which local muscle oxygenation was measured with a NIRS device (Moxy monitor). Wingate power outputs were measured (peak power [W/kg] and average power [W/kg]), together with muscle oxygenation variables (baseline oxygen saturation [%], desaturation slope [%/s], minimum oxygen saturation [%], half time recovery [s], and maximum oxygen saturation [%]). Results: The differences were not obtained between freedivers and spearfisherman in power outputs (peak power (9.24±2.08 spearfisherman; 10.68±1.04 freedivers; P=0.14); average power (6.85±0.95 spearfisherman; 7.44±0.60 freedivers; P=0.15) and muscle oxygenation parameters. However, analysis of effect size showed a moderate effect in training experience (0.71), PP (0.89), AP (0.75), Desat slope mVLR (0.66), half time recovery mVLR (0.90). Conclusions: The non-existence of differences between freedivers and spearfishermen indicates similar training adaptations to the anaerobic demands. However, the results show relatively low anaerobic capacities of our divers that could serve as an incentive for the further development of these mechanisms.

Wang HH, Chen YT, Chou SF, Lee LC, Wang JH, Lai YH, Chang HT. Effect of the timing of hyperbaric oxygen therapy on the prognosis of patients with idiopathic sudden sensorineural hearing loss. Biomedicine. 2023 Sep 29;11(10):2670.

This study aimed to evaluate the effects of hyperbaric oxygen therapy (HBOT) on the hearing recovery of

patients with idiopathic sudden sensorineural hearing loss (ISSNHL). The clinical data of 79 patients diagnosed with ISSNHL and treated with HBOT between January 2017 and December 2019 were retrospectively reviewed. The pure tone audiometry (PTA) scores before and after HBOT were recorded. The associations of HBOT efficacy with demographic and clinical characteristics and the duration from disease onset to HBOT administration were determined. The average PTA score was 80.06±25.94 dB before and 60.75±21.26 dB after HBOT; the difference was significant. HBOT improved the hearing of 55.7% of the patients with ISSNHL (defined as an average PTA ≥11dB or a final average PTA score below 29 dB). There was a significant inverse relationship between the duration from symptom onset to HBOT administration and PTA score reduction after HBOT, which was adjusted for factors including age, sex, laterality of hearing loss, initial PTA score, reception of intratympanic steroid injections, tinnitus, dizziness, vertigo, diabetes, hypertension, and coronary artery disease. Commencing HBOT at an earlier stage is closely linked to greater improvements in hearing for patients with ISSNHL.

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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