

E-NEWS

EDITORIAL NOTE – November 2018

The E-News is the monthly newsletter of CUHMA used to share news and information. We invite relevant content, including announcements, upcoming conferences, new publication abstracts, job postings, professional perspectives, incident reports, and relevant images of related professional scenes. Feel free to share issues with interested colleagues. All past issues are available at <https://cuhma.ca>.

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NEWS/ANNOUNCEMENTS

Documentary on Rebreather Diving Fatality

A documentary on the death of Canadian conservationist and cinematographer Rob Stewart was released on October 26: 'The third dive: the death of Rob Stewart.' Visit: <https://www.cbc.ca/cbcdocs/pov/episodes/the-third-dive-the-death-of-rob-stewart>

Tobermory Hyperbaric Unit and EMS Protocols

The conflict between the Tobermory Hyperbaric Unit and emergency medical services continues to make the news. Print:

<https://www.cbc.ca/news/canada/toronto/diving-accident-scuba-tobermory-ems-decompression-1.4877883>

Broadcast (16:30-19:10 in program):

<https://www.cbc.ca/news/canada/toronto/cbc-toronto-news-october-26-2018-1.4881139?fbclid=IwAR0Vyb-2-4zE-0RryRImFRx6B3IyHOqefiSjVKkziy0nRAicagWGoMA4SQ>

CUHMA Board of Directors Elections

Electronic polling will close on November 02 at 2200 ET. Candidate bios and statements can be found in the October 2018 E-News.

UPCOMING EVENTS

CUHMA Annual Scientific Meeting 2018

The meeting will be held November 02-04 in Quebec City, hosted by Université Laval and Hôtel-Dieu de Lévis. For details: <https://cuhma.ca>.

EUROTEK 2018

EUROTEK will be held December 01-02 in Birmingham, England. Lectures and exhibitors will cover the range of current and emerging equipment, concepts, and issues. Visit: <http://eurotek.uk.com>.

OZTek 2019

OZTek 2019 will be held March 16-17 at the International Convention Centre in Sydney, Australia. For further information, see: www.diveoztek.com.

Undersea Medicine Canada Level 2 Course

Undersea Medicine Canada is offering a CSA Z275.2-15 Level 2 'Advanced Course in Diving Medicine: Diagnosis and Treatment' in Halifax, NS May 6-11, 2019. Augmenting classroom instruction and case-based learning, site visits will be arranged to observe commercial diver training and diving operations. A CSA Z275.2-15 Level 1 'Introductory Course in Diving Medicine: Fitness to Dive' or equivalent training is a prerequisite for this 50-hour course. Further details will be added to the Undersea Medicine Canada website in the coming weeks (www.underseamedicine.ca). Registration will open in early 2019.

RECENT PUBLICATIONS

Anheuser P, Mühlstädt S, Kranz J, Schneidewind L, Steffens J, Fornara P. Significance of hyperbaric oxygenation in the treatment of Fournier's gangrene: a comparative study. Urol Int. 2018 Oct 16:1-5. doi: 10.1159/000493898. [Epub ahead of print]

INTRODUCTION: Hyperbaric oxygenation (HBO), in addition to anti-infective and surgical therapy, seems to be a key treatment point for Fournier's gangrene. The aim of this study was to investigate the influence of HBO therapy on the outcome and prognosis of Fournier's gangrene. **PATIENTS AND METHODS:** In the present multicenter, retrospective observational study, we evaluated the data of approximately 62 patients diagnosed with Fournier's gangrene between 2007 and 2017. For comparison, 2 groups were distinguished: patients without HBO therapy (group A, n=45) and patients with HBO therapy (group B, n=17). The analysis included sex, age, comorbidities, clinical symptoms, laboratory and microbiological data, debridement frequency, wound dressing, antibiotic use, outcome and prognosis. The statistical analysis was

performed with GraphPad Prism 7® (GraphPad Software, Inc., La Jolla, USA). RESULTS: Demographic data showed no significant differences. The laboratory parameters C-reactive protein and urea were significantly higher in group B (group B: 301.7 vs. 140.6 mg/dL; group A: 124.8 vs. 54.7 mg/dL). Sepsis criteria were fulfilled in 77.8 and 100% of the patients in groups A and B respectively. Treatment in the intensive care unit (ICU) was therefore indicated in 69% of the patients in group A and 100% of the patients in group B. The mean ICU stay was 9 and 32 days for patients in groups A and B respectively. The wound debridement frequency and hospitalization stay were significantly greater in group B (13 vs 5 debridement and 40 vs 22 days). Initial antibiotics was test validated in 80% of the patients in group A and 76.5% of the patients in group B. Mortality was 0% in group B and 4.4% in the group A. CONCLUSION: The positive influence of HBO on the treatment of Fournier's gangrene can be estimated only from the available data. Despite poorer baseline findings with comparable risk factors, mortality was 0% in the HBO group. The analysis of a larger patient cohort is desirable to increase the significance of the results.

Arieli R. Fatty diet, active hydrophobic spots, and decompression sickness. *Diving Hyperb Med.* 2018; 48(3):197. doi: 10.28920/dhm48.3.197.

In a study of the effect of a fatty diet on decompression bubbles, based on the responses to a questionnaire regarding daily food consumption, the approximate fat intake for each diver was calculated, taking into account the maximum recommended intake for a person doing his type of work. Following hyperbaric exposure, divers were divided into two groups: 'bubblers' (a minimum of the second level on the Kisman-Masurel scale) and 'non-bubblers'. Bubblers had higher fat consumption than non-bubblers (146±39% versus 92±18%). There was only a small difference in body mass index between the two groups: 26.3±3.3 kg·m⁻² for bubblers and 24.9±1.9 kg·m⁻² for non-bubblers. Cholesterol and triglycerides in serum were high in the bubblers (211±39 mg·dl⁻¹ and 230±129 mg·dl⁻¹, respectively) compared with the non-bubblers (188±34 mg·dl⁻¹ and 153±111 mg·dl⁻¹, respectively). The authors concluded that a high-fat diet significantly increased the severity of decompression stress in hyperbaric air exposures. However, their explanation that the increased amount of fat in the serum contained more dissolved nitrogen, and that this was the cause of the increase in bubble production, was challenged in a subsequent letter. Decompression bubbles can expand and develop only from pre-existing gas micronuclei. It is known that nanobubbles form spontaneously when a smooth hydrophobic surface is submerged in water containing dissolved gas. We have shown that these nanobubbles are the gas micronuclei underlying decompression bubbles and decompression sickness. It has

been suggested that hydrophobic multilayers of phospholipids on the luminal aspect of blood vessels, which we have termed active hydrophobic spots (AHS), were derived from lung surfactant. The essential components of lung surfactant required to construct the surfactant films, namely dipalmitoylphosphatidylcholine (DPPC) and surfactant proteins B and C, were found in the plasma of man and sheep, while DPPC was also found at the AHS. These findings have borne out the assumption that lung surfactants are the source of the AHS on the luminal aspect of blood vessels. These AHS seem to be stable, and their number and size increase with age as more DPPC settles. Bubbles may evolve at these AHS with decompression. The nanobubbles so formed on the surface of these lamellar layers of phospholipids in divers will expand into venous bubbles on decompression. The main surfactant in the lung is DPPC (40%), with the presence of additional components including other phospholipids, glycerides, and cholesterol. In the cited study, only serum triglycerides and cholesterol were measured, whereas it may well be that other phospholipids and fatty acids were carried by proteins in the plasma. We suggest that, as with the different elements which compose the layers of surfactant in the lung, some of the additional fatty components carried by the blood will attach themselves to the AHS, thus contributing further to their enlargement. We hypothesise that divers who consume food that is high in fat, and as a result have more fatty components in their blood, will develop more and larger AHS, subsequently becoming bubblers with a higher risk of decompression illness.

Bagli BS, Çevik SG, Çevik MT. Effect of hyperbaric oxygen treatment in central retinal artery occlusion. *Undersea Hyperb Med.* 2018 Jul-Aug;45(4):421-5.

BACKGROUND: Central retinal artery occlusion (CRAO) is a rare and serious ophthalmologic emergency with a bad prognosis. Hyperbaric oxygen (HBO₂) treatment has been reported to improve visual acuity of CRAO patients. However, there are unknown variables for HBO₂ treatment such as initiation period, number of sessions and efficacy. In this study, we aimed to investigate efficacy of HBO₂ treatment in CRAO patients. METHODS: Patients who had been diagnosed with CRAO and referred to our Hyperbaric Oxygen Treatment Unit with the indication of HBO₂ treatment were included in the study. Patient demographics, their systemic diseases, best-corrected visual acuity (BCVA) and the time of visual loss were recorded. Oral acetazolamide and topical beta blocker treatments as well as HBO₂ treatments were administered to patients as soon as possible. Patients received 20 treatments as standard. Visual acuity was examined and recorded following each HBO₂ treatment administration. RESULTS: 10 eyes (five right, five left) of 10 patients) were included in the study. While average visual acuity was LogMAR 3 before the treatment, it was

measured as LogMAR 1.8 on average after treatment ($P < 0.05$). None of the patients were observed to have neovascular glaucoma. **CONCLUSIONS:** HBO₂ treatment is an efficacious method with few side effects and can be used in the treatment of CRAO patients. During acute and subacute periods a certain number of HBO₂ treatment sessions may be beneficial. Stopping treatments before eight completed HBO₂ sessions for a patient who did not show improvement until that time may miss a patient who would have benefited from HBO₂ treatment.

Bosco G, Vezzani G, Mrakic Sposta S, Rizzato A, Enten G, Abou-Samra A, Malacrida S, Quartesan S, Vezzoli A, Camporesi E. Hyperbaric oxygen therapy ameliorates osteonecrosis in patients by modulating inflammation and oxidative stress. J Enzyme Inhib Med Chem. 2018;33(1):1501-5.

Early stages of avascular necrosis of the femoral head (AVNFB) can be conservatively treated with hyperbaric oxygen therapy (HBOT). This study investigated how HBOT modulates inflammatory markers and reactive oxygen species (ROS) in patients with AVNFB. Twenty-three male patients were treated with two cycles of HBOT, 30 sessions each with a 30 days break between cycles. Each session consisted of 90 minutes of 100% inspired oxygen at 2.5 absolute atmospheres of pressure. Plasma levels of tumor necrosis factor alpha (TNF- α), interleukin 6 (IL-6), interleukin 1 beta (IL-1 β) and ROS production were measured before treatment (T0), after 15 and 30 HBOT sessions (T1 and T2), after the 30-day break (T3), and after 60 sessions (T4). Results showed a significant reduction in TNF- α and IL-6 plasma levels over time. This decrease in inflammatory markers mirrored observed reductions in bone marrow edema and reductions in patient self-reported pain.

Brouwer RJ, Engberts AC, Borger van der Burg BL, van Dongen TT, van Hulst RA, Hoencamp R. Meta-analysis on the effect of hyperbaric oxygen as adjunctive therapy in the outcome of anastomotic healing of experimental colorectal resections in rats. Diving Hyperb Med. 2018;48(3):173-85.

BACKGROUND: Colorectal cancer is the third most common form of cancer and colorectal surgery is the treatment of choice in local disease. Anastomotic leakage following colorectal surgery is a major complication with a high incidence and mortality. Adjuvant hyperbaric oxygen treatment (HBOT) may be associated with reduction of anastomotic leakage. A systematic review was conducted regarding HBOT as an adjunctive therapy to colorectal surgery. **METHODS:** Systematic review (1900-2017) using PubMed, Cochrane, EMBASE, Web of Science and EMCARE. All original published studies on the effect of HBOT as an adjunctive therapy for colorectal surgery with the creation of an anastomosis were considered. **RESULTS:** Thirteen small animal trials were

included for qualitative synthesis. We found no human trials. Eleven trials used bursting pressure whilst eight used hydroxyproline levels as a marker for collagen synthesis as primary outcome to assess the strength of the anastomosis. A meta-analysis performed for normal and ischaemic anastomoses showed that postoperative HBOT improves bursting pressure and hydroxyproline levels significantly in both normal ($p \leq 0.001$ and $p = 0.02$) and ischaemic anastomoses ($p \leq 0.001$ and $p = 0.04$). **CONCLUSION:** Postoperative HBOT has a positive effect on colorectal anastomoses in rats. Further research should focus on a larger systematic animal study.

Cyran AM, Kosla A, Kantor I, Szczepanski MJ. Tympanometric evaluation of Eustachian tube function in Polish scuba divers. Undersea Hyperb Med. 2018; 45(4):437-43.

BACKGROUND: Scuba divers are subjected to relatively high ambient pressures while descending. Equalizing maneuvers (eg., Valsalva) are necessary to open the Eustachian tube (ET) and allow air into the middle ear (ME) cavity. Insufficient opening of the ET leads to ME barotrauma, which is the most common injury related to scuba diving. The study aims were to assess the incidence of ME barotrauma and to compare tympanometric parameters and stapedial reflexes in scuba divers and non-diving individuals. **MATERIAL AND METHODS:** 60 scuba divers participated in the study; control consisted of 90 non-diving volunteers without a history of otolaryngologic problems. All participants were examined with the use of otoscopy and tympanometry with evaluation of ipsilateral stapedial reflexes. The group studied was surveyed regarding occurrence of ME barotrauma and diving competence. **RESULTS:** 51.7% of the divers experienced ME barotrauma, the most common symptoms being earache and hearing loss. Comparison of the group studied and control revealed significantly lower ME pressure and compliance in scuba divers. In scuba divers with ME barotrauma, longer time from injury correlates directly with greater ME pressure and compliance, indicating tissue recovery. At 4,000Hz 100dB percentage of present stapedial reflexes among scuba divers was significantly lower than in controls; moreover, a greater number of dives correlated inversely with percentage of present stapedial reflexes at 4000Hz 100dB. The reduced thresholds at high intensities suggest a negative effect of scuba diving on hearing. **CONCLUSIONS:** ME pressure and compliance, however still within the norm, are significantly lower in scuba divers than in non-diving healthy volunteers. This may be attributed to a subclinical form of barotrauma.

Eryigit B, Ziylan F, Yaz F, Thomeer HGXM. The effectiveness of hyperbaric oxygen in patients with idiopathic sudden sensorineural hearing loss: a systematic review. Eur Arch Otorhinolaryngol. 2018 Oct

15. doi: 10.1007/s00405-018-5162-6. [Epub ahead of print]

OBJECTIVE: To evaluate the effectiveness of hyperbaric oxygen in the treatment of patients with idiopathic sudden sensorineural hearing loss (ISSHL). **DATA SOURCES:** An Embase, MEDLINE and Cochrane search were utilised to identify various clinical trials on the treatment of ISSHL. Studies that were published between 2002 and 2018 and written in the English, Dutch or German language were included. Search terms included synonyms for idiopathic sudden hearing loss. **DATA SYNTHESIS:** A total of 16 articles were identified regarding hyperbaric oxygen therapy. All patients were evaluated with pure-tone audiometry. A major part of the cases presented with unilateral hearing loss (bilateral hearing loss less than 5%). In several studies, the average of the mean hearing gain at five contiguous frequencies was significantly higher in the hyperbaric oxygen (HBO) therapy and systemic steroid (SS) group in patients with severe or profound hearing impairment. They recorded a significant treatment effect ($p = 0.005$) of HBO + SS therapy on patients with an initial hearing loss of ≥ 81 dB. **CONCLUSIONS:** On the whole group of ISSHL patients, no significant difference was demonstrated between the intervention and control group. However, in severe or profound hearing-impaired ISSHL patients, significant benefit was observed in the intervention group. These results likely indicate that adding HBO to steroid therapies might be of benefit in cases of severe and profound hearing impairment.

Glik J, Cholewka A, Englisz B, Stanek A, Sieroń K, Mikuś-Zagórska K, Knefel G, Nowak M, Kawecki M. Thermal imaging and planimetry evaluation of the results of chronic wounds treatment with hyperbaric oxygen therapy. Adv Clin Exp Med. 2018 Sep 21. doi: 10.17219/acem/92304. [Epub ahead of print]

BACKGROUND: One of the methods to treat chronic wounds is the use of hyperbaric oxygen (HBO). Objective measurement of the wound surface is an important element in the process of monitoring and predicting the progress of treatment. **OBJECTIVES:** The aim of the study was to evaluate the effect of hyperbaric oxygen therapy (HBOT) on ulcer wound healing in patients with chronic venous insufficiency ulcers and diabetic foot syndrome using thermal imaging and computerized planimetry. **MATERIAL AND METHODS:** During a 3-year period, 284 digital computer planimetry measurements were gathered from 142 patients treated for leg ulcers caused by chronic venous insufficiency and ulcers from diabetic foot syndrome at HBOT Unit of the Dr Stanisław Sakiel Centre for Burns Treatment in Siemianowice Śląskie (Poland). Each patient took 30 HBOT sessions using a Haux multiplace HBO chamber at a pressure of 2.5 atmospheres absolute (ATA). The results of the treatment were monitored by thermovision and computerassisted planimetry measurements performed

before and after HBOT. **RESULTS:** Both groups of patients exhibited a reduction in the surface and perimeter of the wound after HBOT. The treatment effects were also confirmed by thermal imaging. The areas calculated from thermal imaging and planimetry are different but correlated. **CONCLUSIONS:** It seems that a combination of thermal imaging and planimetry may enhance the diagnosis as well as provide the physician with more information about therapy effects.

Hadanny A, Abbott S, Suzin G, Bechor Y, Efrati S. Effect of hyperbaric oxygen therapy on chronic neurocognitive deficits of post-traumatic brain injury patients: retrospective analysis. BMJ Open. 2018 Sep 28;8(9):e023387. doi: 10.1136/bmjopen-2018-023387.

OBJECTIVES: The aim of the study is to evaluate the effect of hyperbaric oxygen therapy (HBOT) in participants suffering from chronic neurological deficits due to traumatic brain injury (TBI) of all severities in the largest cohort evaluated so far with objective cognitive function tests and metabolic brain imaging. **METHODS:** A retrospective analysis was conducted of 154 patients suffering from chronic neurocognitive damage due to TBI, who had undergone computerised cognitive evaluations pre-HBOT and post-HBOT treatment. **RESULTS:** The average age was 42.7 ± 14.6 years, and 58.4% were men. All patients had documented TBI 0.3-33 years (mean 4.6 ± 5.8 , median 2.75 years) prior to HBOT. HBOT was associated with significant improvement in all of the cognitive domains, with a mean change in global cognitive scores of 4.6 ± 8.5 ($p < 0.00001$). The most prominent improvements were in memory index and attention, with mean changes of 8.1 ± 16.9 ($p < 0.00001$) and 6.8 ± 16.5 ($p < 0.0001$), respectively. The most striking changes observed in brain single photon emission computed tomography images were in the anterior cingulate and the postcentral cortex, in the prefrontal areas and in the temporal areas. **CONCLUSIONS:** In the largest published cohort of patients suffering from chronic deficits post-TBI of all severities, HBOT was associated with significant cognitive improvements. The clinical improvements were well correlated with increased activity in the relevant brain areas.

Heyboer M, Byrne J, Pons P, Wolner E, Seargent S, Wojcik SM. Use of in-chamber transcutaneous oxygen measurement to determine optimal treatment pressure in patients undergoing hyperbaric oxygen therapy. Undersea Hyperb Med. 2018;45(4):389-94.

INTRODUCTION: Hyperbaric oxygen (HBO₂) therapy is used to promote healing in select problem wounds. Transcutaneous oxygen measurement (TCOM) can be used to predict the response of these wounds to HBO₂, with in-chamber TCOM values shown to be the most predictive. We evaluated the use of in-chamber TCOM values to determine optimal treatment pressure.

METHODS: A retrospective review was completed of patients undergoing HBO₂ therapy for a lower-extremity wound and who had in-chamber TCOM. Data collected included TCOM values, treatment profile, and patient outcome. **RESULTS:** A total of 142 patients were identified. The overall results demonstrated healing in 59%, minor amputation (below ankle) in 11.3%, and major amputation (above ankle) in 16.2% of patients. 79.3% of patients at 2 atmospheres absolute (ATA) and 86.6% of patients at 2.4 ATA had transcutaneous oxygen pressure (TcPO₂) values ≥ 250 mmHg. Among those with TcPO₂ < 250 mmHg at 2 ATA, 41% attained TcPO₂ ≥ 250 mmHg at 2.4 ATA. Among those treated at 2 ATA the healing rate was 70.6% if TcPO₂ ≥ 250 mmHg, and 11.8% if TcPO₂ < 250 mmHg ($P < 0.001$). Among those treated at 2.4 ATA the healing rate was 33.3% if TcPO₂ ≥ 250 mmHg and 14.3% if TcPO₂ < 250 mmHg ($P < 0.001$). **DISCUSSION:** Determining optimal therapeutic pressure for patients undergoing HBO₂ is important to maximize benefit and minimize risk. This study indicates that in-chamber TCOM can be used to select an individualized optimal treatment pressure in patients undergoing HBO₂ for lower-extremity wounds, including diabetic foot ulcers. This may result in better utilization of HBO₂ and better outcomes.

Hosokawa S, Hosokawa K, Takahashi G, Sugiyama KI, Nakanishi H, Takebayashi S, Mineta H. Hyperbaric oxygen therapy as concurrent treatment with systemic steroids for idiopathic sudden sensorineural hearing loss: a comparison of three different steroid treatments. Audiol Neurootol. 2018 Oct 9;23(3):145-151. doi: 10.1159/000493083. [Epub ahead of print]

We analyzed 356 patients with idiopathic sudden sensorineural hearing loss treated with hyperbaric oxygen therapy and systemic steroids ($n=161$), systemic steroids alone ($n=160$), or intratympanic and systemic steroids ($n=35$). The main outcome measure was the hearing recovery rate. The effect of other variables, including the initial averaged 5-frequency hearing level, patient age, interval between the onset of symptoms and treatment, presence of vertigo as a complication, presence of diabetes mellitus, smoking history, and presence of hypertension, on the hearing recovery rate was also evaluated. The overall hearing recovery rate was significantly higher for the patients treated with hyperbaric oxygen therapy and systemic steroids than for those treated with systemic steroids alone ($p < 0.001$) or systemic and intratympanic steroids ($p < 0.001$). The presence of vertigo negatively affected hearing recovery. Our findings suggest that hyperbaric oxygen therapy confers a significant additional therapeutic benefit when used in combination with steroid therapy for idiopathic sudden sensorineural hearing loss.

Irawan H, Semadi IN, Widiana IGR. A pilot study of short-duration hyperbaric oxygen therapy to improve

HbA1c, leukocyte, and serum creatinine in patients with diabetic foot ulcer Wagner 3-4. ScientificWorldJournal. 2018 Aug 12;2018:6425857. doi: 10.1155/2018/6425857. eCollection 2018.

OBJECTIVE: To evaluate the short-duration hyperbaric oxygen therapy (HBOT) can improve HbA1c levels, leukocyte count, and serum creatinine levels in patients with diabetic foot ulcer (DFU) Wagner 3-4. **METHODS:** Blood samples from all DFU patients at Sanglah General Hospital, Denpasar, were taken for HbA1c, leukocyte, and serum creatinine test before debridement procedure, and the patients were then grouped into either standard therapy or standard therapy with HBOT for 10 sessions (combination therapy). At the end of therapy, all blood tests were resumed. **RESULTS:** Each group consisted of 15 patients. Results of laboratory analysis before and after treatment were significant regarding decrease of HbA1c levels in standard therapy (10.98 ± 2.37 % to 9.70 ± 2.46 %; $p=0.006$), HbA1c levels in combination therapy (9.42 ± 1.96 % to 7.07 ± 1.16 %; $p < 0.001$), and leukocyte count in combination therapy ($13.97 \pm 6.24 \times 10^3$ cells/ μ L to $8.84 \pm 2.88 \times 10^3$ cells/ μ L; $p=0.009$). The HbA1c levels at the end of therapy were significantly different between groups ($p=0.001$). Serum creatinine level was decreased only in combination therapy but it was not significant. The effect size of all variables was larger in the combination therapy, but it was not significant ($p > 0.05$). **CONCLUSION:** The use of short-duration HBOT on DFU reduces HbA1c levels, leukocyte count, and serum creatinine levels better than standard therapy alone. This protocol would save time and effort in future HBOT implementation. This trial is registered with ClinicalTrials.gov Identifier: NCT03615755.

Jairath V. Hyperbaric oxygen for hospitalized patients with ulcerative colitis. Am J Gastroenterol. 2018 Aug 29. doi: 10.1038/s41395-018-0224-3. [Epub ahead of print]

One quarter of patients with ulcerative colitis will develop a severe acute exacerbation of disease during their lifetime. Despite high dose corticosteroids, half of these patients will fail subsequent medical rescue therapy, and half will require colectomy within 5 years. Dulai and colleagues report the results of a fascinating, double blind, sham controlled, proof of concept trial which demonstrated that administration of short term hyperbaric oxygen therapy (HBOT) at the point of presentation with severe UC was able to rapidly induce short term remission and avoid the need for urgent second line medical rescue therapy. Further dose finding studies are underway.

Jenwitheesuk K, Mahakkanukrauh A, Punjaruk W, Jenwitheesuk K, Chowchuen B, Jinaporntham S, Uraivan K, Limrattanapimpa P. Efficacy of adjunctive hyperbaric oxygen therapy in osteoradionecrosis. Biores Open Access. 2018 Oct 8;7(1):145-9.

Osteoradionecrosis (ORN) is a common consequence resulting from radiation in patients with cancer. Presently, hyperbaric oxygen therapy (HBOT) is proposed to have a role in improving wound healing in ORN patients. There is no strong scientific evidence to confirm the benefits of HBOT for treatment of ORN as an adjunctive treatment. This study aimed to determine the benefits of adjunctive treatment of HBOT in ORN. A retrospective study was conducted at the Srinagarind Hospital, the Faculty of Medicine, Khon Kaen University, Thailand, between 2011 and 2017. The patients diagnosed with ORN, who received adjunctive HBOT before the operation, were enrolled. Complete healing of wounds was the primary outcome. There were 84 ORN patients with a mean age of 58.78 years; 54.76% were male and 45.24% were female. HBOT had a role significant in improving wound healing of ORN patients with stages 1 and 2. Poisson regression analysis showed that stage 3 of ORN negatively correlated with the number of HBOT dives ($p=0.001$, incidence rates ratio = 0.85). In conclusion, HBOT improved wound healing of ORN patients with stages 1 and 2. In addition, stage 2 of ORN patients significantly required the highest number of HBOT dives compared to other types of ORN to promote wound healing, whereas stage 3 patients, who underwent bone debridement combined with HBOT, initiated to success of treatment process and required a smaller number of dives.

Jones B, Cooper CE. Near infrared spectroscopy (NIRS) observation of vastus lateralis (muscle) and prefrontal cortex (brain) tissue oxygenation during synchronised swimming routines in elite athletes. *Adv Exp Med Biol.* 2018;1072:111-7.

The development of underwater near-infrared spectroscopy (uNIRS) has enabled the measurement of tissue oxygenation within the swim environment. Unique physiological responses, such as the diving reflex, have been shown to occur during synchronized swimming and demonstrate an innate oxygen-conserving reflex. However, the prevalence of a sudden loss of consciousness ('hypoxic blackout') is an ongoing concern in this swim population. The purpose of this study was to investigate the reported low tissue oxygen conditions experienced in elite level synchronized swimmers (SyncS) during swim routines. Changes in peripheral muscle and brain oxygenation (tissue saturation index (TSI %)) were continuously recorded during simulated synchronized swim routines. Six elite female synchronized swimmers were assessed; age 29.0 ± 4.4 years; height 168.4 ± 7.1 cm; weight 53.2 ± 3.2 kg; quadriceps skin fold; 10.2 ± 0.8 mm; Δ TSI (%) between the vastus lateralis (VL) and prefrontal cortex (PFC) were analyzed using paired (two-tailed) t-tests. The level of significance for analysis was set at $p<0.05$. Significant difference ($p=0.001$) was found in Δ TSI (%) between the VL and PFC. During dynamic leg kicking exercise, the initial effect of each leg kicking

sequence is a rapid drop in TSI (%). This is consistent with an initial constriction (drop in blood flow in the muscle) accompanied by an increase in oxygen consumption. Cerebral oxygenation (PFC) remained largely unchanged during both maximal breath-hold and during vigorous exercise, presumably due to protective mechanisms in the brain in this population. We conclude that uNIRS is able to provide novel insights into SyncS hemodynamic responses and could be used to inform on the safety of new routines.

Kjeld T, Stride N, Gudiksen A, Hansen EG, Arendrup HC, Horstmann PF, Zerahn B, Jensen LT, Nordsborg N, Bejder J, Halling JF. Oxygen conserving mitochondrial adaptations in the skeletal muscles of breath hold divers. *PLoS One.* 2018 Sep 19;13(9):e0201401. doi: 10.1371/journal.pone.0201401. eCollection 2018.

BACKGROUND: The performance of elite breath hold divers (BHD) includes static breath hold for more than 11 minutes, swimming as far as 300 m, or going below 250 m in depth, all on a single breath of air. Diving mammals are adapted to sustain oxidative metabolism in hypoxic conditions through several metabolic adaptations, including improved capacity for oxygen transport and mitochondrial oxidative phosphorylation in skeletal muscle. It was hypothesized that similar adaptations characterized human BHD. Hence, the purpose of this study was to examine the capacity for oxidative metabolism in skeletal muscle of BHD compared to matched controls. **METHODS:** Biopsies were obtained from the lateral vastus of the femoral muscle from 8 Danish BHD and 8 non-diving controls (Judo athletes) matched for morphometry and whole body $VO_{2\max}$. High resolution respirometry was used to determine mitochondrial respiratory capacity and leak respiration with simultaneous measurement of mitochondrial H_2O_2 emission. Maximal citrate synthase (CS) and 3-hydroxyacyl CoA dehydrogenase (HAD) activity were measured in muscle tissue homogenates. Western Blotting was used to determine protein contents of respiratory complex I-V subunits and myoglobin in muscle tissue lysates. **RESULTS:** Muscle biopsies of BHD revealed lower mitochondrial leak respiration and electron transfer system (ETS) capacity and higher H_2O_2 emission during leak respiration than controls, with no differences in enzyme activities (CS and HAD) or protein content of mitochondrial complex subunits myoglobin, myosin heavy chain isoforms, markers of glucose metabolism and antioxidant enzymes. **CONCLUSION:** We demonstrated for the first time in humans, that the skeletal muscles of BHD are characterized by lower mitochondrial oxygen consumption both during low leak and high (ETS) respiration than matched controls. This supports previous observations of diving mammals demonstrating a lower aerobic mitochondrial capacity of the skeletal muscles as an oxygen conserving adaptation during prolonged dives.

Kiboub FZ, Balestra C, Loennechen Ø, Eftedal I. Hemoglobin and erythropoietin after commercial saturation diving. *Front Physiol.* 2018 Aug 21;9:1176. doi: 10.3389/fphys.2018.01176. eCollection 2018.

Saturation divers are exposed to elevated partial pressure of oxygen (ppO₂) in their hyperbaric work environment. Experimental studies indicate that oxygen transport is altered, and we have previously reported a drop in hematocrit and extensive downregulation of genes involved in blood oxygen transport capacity after decompression from professional saturation diving. Here we investigate the initial period of hematological adjustment back to normobaric air after professional saturation diving. Erythropoietin (EPO) and hemoglobin (Hb) were measured in blood from 13 divers at two time-points after saturation assignments lasting up to 4 weeks; first immediately after decompression and again 24 h later. Pre-dive levels defined baselines. The ppO₂ varied from 40 kPa in the saturation chambers during storage, 50 to 80 kPa during bell excursions, and gradually reduced to 21 kPa during decompression to surface pressure. EPO was similar to baseline immediately after saturation diving (P=0.4), and markedly increased within the next 24 h (99%, P<0.0002). Hb levels remained slightly reduced at both time-points (4% immediately after; P=0.02, 8% 24 h after; P<0.001). The results imply that the hematological acclimatization back to normobaric air was ongoing, but not completed, during the first 24 h after professional saturation diving.

Li Y, Zhang H, Hao YF, Liang Y, Wei LG, Xu TS, Wang T. Evaluation of hyperbaric oxygen effects on slow coronary flow patients using gated myocardial perfusion imaging tomography. *Undersea Hyperb Med.* 2018;45(4):403-9.

Hyperbaric oxygen (HBO₂) is widely used in clinical settings for many disease treatments. To investigate the potential effects of hyperbaric oxygen on patients with slow coronary flow (SCF) we retrospectively analyzed 98 patients who were diagnosed with SCF by coronary artery angiography. Of these, 50 patients received conventional treatment only (control group; the other 48 patients received hyperbaric oxygen treatment for four weeks in addition to the routine therapy (HBO₂ group). By using gated myocardial perfusion tomography examination before and after treatment, we observed that 71 out of 148 (47.9%) subsegments of injured myocardium improved in the control group, while 108 out of 151 (71.5%) subsegments of injured myocardium improved in the HBO₂ group (P<0.05). Furthermore, the peak filling rate (PFR), time of peak filling rate (TPFR) and mean filling rate during the first one-third of the filling time (MFR/3) were all significantly improved in HBO₂-treated patients compared to those who received conventional treatment only. However, we did not detect any significant effects of

only treatment on left ventricular end diastolic volume (LVEDV), left ventricular end systolic volume (LVESV), nor on left ventricular ejection fraction (LVEF). Our results indicate that hyperbaric oxygen therapy can be a beneficial and effective medication to improve myocardial perfusion and left ventricular diastolic function in SCF patients.

Liao WC, Cheng WC, Wu BR, Chen WC, Chen CY, Chen CH, Tu CY, Hsia TC. Outcome and prognostic factors of patients treated in the intensive care unit for carbon monoxide poisoning. *J Formos Med Assoc.* 2018 Oct 5. pii: S0929-6646(17)30386-8. doi: 10.1016/j.jfma.2018.09.005. [Epub ahead of print]

BACKGROUND: Carbon monoxide (CO), a colorless and odorless gas, is one of the common causes of poisoning-related deaths worldwide. CO poisoning can result in hypoxic brain damage and death, but intensive care can improve the likely outcome for critically ill patients. However, there is a paucity of clinical data regarding the prognostic factors and association between organ dysfunction and clinical outcome of patients treated for CO poisoning in the intensive care unit (ICU). **METHODS:** We performed a retrospective study of patients admitted to a university affiliated hospital ICU between July 2001 and December 2010 following CO poisoning. Outcomes were survival to ICU discharge and to hospital discharge. **RESULTS:** Seven hundred and eighty-seven patients were admitted to the university hospital following CO poisoning, of which 140 (17.8%) were admitted to the hospital ICU. The overall mortality rate of the patients admitted to the ICU was 14.3% (20/140). Univariate analysis indicated that non-surviving patients with CO poisoning were more likely to have initial blood carboxyhemoglobin (COHb) level >30%, shock, acute respiratory failure, Acute Physiology and Chronic Health Evaluation II (APACHE II) score ≥25, Glasgow coma scale (GCS) score of 3, acute renal failure, dysfunction or failure of more than 3 organs, low blood pH, low HCO₃⁻ level, high potassium level, and high glucose level. They were also more likely to have not received hyperbaric oxygen (HBO) intervention. Multivariate logistical regression analysis indicated that the mortality rate of patients treated in the ICU for CO poisoning was higher if their initial APACHE II score was ≥25, GCS was 3, and more than 3 organs were dysfunctional. Moreover, HBO intervention in ICU significantly decreased patients' risk of mortality due to CO poisoning. **CONCLUSION:** In conclusion, we observed that APACHE II score >25, GCS 3, and dysfunction of more than 3 organ systems on admission to emergency department was associated with a significant mortality risk in patients treated in the ICU for CO poisoning. Moreover, HBO therapy could reduce the risk of mortality in patients with CO poisoning in ICU.

Lin CH, Su WH, Chen YC, Feng PH, Shen WC, Ong JR, Wu MY, Wong CS. Treatment with normobaric or hyperbaric oxygen and its effect on neuropsychometric dysfunction after carbon monoxide poisoning: A systematic review and meta-analysis of randomized controlled trials. *Medicine (Baltimore)*. 2018 Sep;97(39):e12456. doi: 10.1097/MD.00000000000012456.

BACKGROUND: Carbon monoxide (CO) poisoning may result in acute neurological sequelae, cognitive sequelae, and delay neurological sequelae. The administration of hyperbaric oxygen (HBO) to prevent the development of delayed neurological sequelae in CO poisoning have extensively investigated but conflicting results have been reported. We performed a systematic literature review and meta-analysis of randomized controlled trials (RCTs) evaluating HBO treatment and its effect on neuropsychometric dysfunction after CO poisoning. **METHODS:** We searched Medline, Embase, Pubmed, and the Cochrane Register of Controlled Trials from inception to December 2017. Eligible studies compared HBO therapy with normobaric oxygen (NBO) in patients with CO poisoning. **RESULTS:** Six studies compared HBO with NBO in CO poisoning patients. Compared with patients treated with NBO, a lower percentage of patients treated with HBO reported headache (16.2% vs 16.5%, relative risk [RR]=0.83, 95% CI=0.38-1.80), memory impairment (18.2% vs 23.8%, RR=0.80, 95% CI=0.43-1.49), difficulty concentrating (15.0% vs 18.4%, RR=0.86, 95% CI=0.55-1.34), and disturbed sleep (14.7% vs 16.2%, RR=0.91, 95% CI=0.59-1.39). Two sessions of HBO treatment exhibited no advantage over one session. **CONCLUSIONS:** The meta-analysis indicated that compared with CO poisoning patients treated with NBO, HBO treated patients have a lower incidence of neuropsychological sequelae, including headache, memory impairment, difficulty concentrating, disturbed sleep, and delayed neurological sequelae. Taking into consideration the cost-effectiveness of one session of HBO, one session of HBO treatment could be an economical option for patients with CO poisoning with high severity.

Marlinge M, Deharo P, Fabrice J, Coulange M, Vairo D, Gaudry M, Egensperger M, Belkhiri L, Zouggargh M, Bruzzese L, Fromonot J, Charnay T, Petit C, Guiol C, Mottola G, Ben Lassoued A, Boussuges A, Guieu R, Louge P. Troponins in scuba divers with immersion pulmonary edema. *Biosci Rep*. 2018 Sep 10. pii: BSR20181024. doi: 10.1042/BSR20181024. [Epub ahead of print]

Immersion pulmonary edema (IPE) is a serious complication of water immersion during scuba diving. Myocardial ischemia can during IPE that worsened outcome. Because myocardial injury impacts the therapeutic management, we aim to evaluate the profile of cardiac markers (creatinine phosphokinase (CPK), BNP,

troponin T (TnT-hs) and troponin I (TnI-us) of divers with IPE. 12 male scuba divers admitted for suspected IPE were included. The collection of blood samples was performed at hospital entrance (T0) and 6 hours later (T0+6 hours). Diagnosis was confirmed by echocardiography or computed-tomography-scan. Mean±SD BNP (pg/mL) was 348±324 at T0 and 223±177 at T0+6 hours (p<0.01), while mean CPK (IU), and mean TnT-hs (pg/mL) increased in the same times 238±200 vs 545±39, (p=0.008) and 128±42vs269±210, (p=0.01) respectively; no significant change was observed concerning TnI-us (pg/mL):110±34vs330±77, p=0.12. At T0+6 hours, 3 patients had high TnI-us while 6 patients had high TnT-hs. Mean CPK was correlated with TnT-hs but not with TnI-us. Coronary angiographies were normal. The increase in TnT during IPE may be secondary to the release of troponin from non-cardiac origin. The measurement of TnI in place of TnT permit in some cases to avoid additional examinations, especially unnecessary invasive investigations.

Perren S, Gatt A, Papanas N, Formosa C. Hyperbaric oxygen therapy in ischaemic foot ulcers in type 2 diabetes: a clinical trial. *Open Cardiovasc Med J*. 2018;12:80-5.

BACKGROUND AND AIMS: Several treatment modalities and protocols for ischaemic foot ulcers are available. However, little consensus exists on optimal treatment. The aim of this study was to compare Standard Wound Care (SWC) alone vs. SWC with adjunct hyperbaric oxygen therapy (HBOT) in the treatment of ischaemic Diabetic Foot Ulcers (DFUs). **PATIENTS AND METHODS:** Twenty-six patients with Type 2 Diabetes Mellitus (T2DM) presenting with a newly diagnosed ischaemic foot ulcer were included. These were divided into group A (SWC with adjunct HBOT) and group B (SWC only). Participants were followed every week for 4 weeks and their ulcers were measured for their surface area and depth to assess any change in wound size. **RESULTS:** Both treatment arms succeeded in reducing ulcer area and depth (p<0.001). However, ulcer area (p<0.001) and depth (p<0.001) exhibited superior improvement in group A. **CONCLUSION:** Adjunctive HBOT appears to improve wound healing in ischaemic DFUs and merits further study

Pougnat R, Pougnat L, Henckes A, Allio I, Lucas D, Dewitte JD, Loddé B. Infectious diseases affecting occupational divers: review of 2017 literature. *Int Marit Health*. 2018;69(3):176-80.

BACKGROUND: Occupational divers are prone to many health risks. For instance, they can get infections. We reviewed the infectious diseases in occupational divers. **MATERIALS AND METHODS:** This is a literature review which went on up to 31.12.2017. The research was carried out on Medline and Scopus databases, in French

and English languages. RESULTS: Fifteen papers report cases of infections in occupational divers. They are mainly skin infections, but also ear-nose-throat and ophthalmological infections. DISCUSSION AND CONCLUSIONS: According to data collected, infections among occupational divers are quite scarce. These diseases are not specific to the workplace, and are comparable with data on recreational diving. Prevention is mainly based on hygiene and equipment maintenance.

Rhee TM, Hwang D, Lee JS, Park J, Lee JM. Addition of hyperbaric oxygen therapy vs medical therapy alone for idiopathic sudden sensorineural hearing loss: a systematic review and meta-analysis. JAMA Otolaryngol Head Neck Surg. 2018 Sep 27. doi: 10.1001/jamaoto.2018.2133. [Epub ahead of print]

IMPORTANCE: Sudden sensorineural hearing loss (SSNHL) causes substantial disease burden for both individuals and socioeconomic aspects. The benefit of hyperbaric oxygen therapy (HBOT) in addition to standard medical therapy (MT) for idiopathic SSNHL has been unclear. OBJECTIVE: To perform a systematic review and meta-analysis to compare HBOT + MT with MT alone as a treatment for patients with SSNHL. DATA SOURCES: PubMed, Embase, and the Cochrane Database of Systematic Reviews were systematically searched up to February 2018. STUDY SELECTION: Randomized clinical trials and nonrandomized studies comparing HBOT + MT with MT alone for SSNHL treatment. DATA EXTRACTION AND SYNTHESIS: Two investigators independently screened the eligible studies, established data, and assessed quality and risk of bias. A systematic review and meta-analysis using random-effects models was conducted. MAIN OUTCOMES AND MEASURES: The primary outcome was complete hearing recovery, and secondary outcomes were any hearing recovery and absolute hearing gain. RESULTS: Three randomized clinical trials and 16 nonrandomized studies comparing outcomes after HBOT + MT vs MT alone in 2401 patients with SSNHL (mean age, 45.4 years; 55.3% female) were included. Pooled odds ratios (ORs) for complete hearing recovery and any hearing recovery were significantly higher in the HBOT + MT group than in the MT alone group (complete hearing recovery OR, 1.61; 95% CI, 1.05-2.44 and any hearing recovery OR, 1.43; 95% CI, 1.20-1.67). Absolute hearing gain was also significantly greater in the HBOT + MT group than in the MT alone group. The benefit of HBOT was greater in groups with severe to profound hearing loss at baseline, HBOT as a salvage treatment, and a total HBOT duration of at least 1200 minutes. CONCLUSIONS AND RELEVANCE: The addition of HBOT to standard MT is a reasonable treatment option for SSNHL, particularly for those patients with severe to profound hearing loss at baseline and those who undergo HBOT as a salvage treatment with a prolonged duration. Optimal criteria for patient selection

and a standardized regimen for HBOT should be applied in routine practice, with future trials to investigate maximal treatment benefit.

Rozycki SW, Brown MJ, Camacho M. Inner ear barotrauma in divers: an evidence-based tool for evaluation and treatment. Diving Hyperb Med. 2018; 48(3):186-93.

OBJECTIVE: To systematically search the literature for studies evaluating the typical presentation and testing that is performed for divers with inner ear symptoms and then to create a tool for clinicians when evaluating a diver with inner ear symptoms. METHODS: Nine databases, including PubMed/MEDLINE were systematically searched through 31 January 2018. The PRISMA statement was followed. RESULTS: Three-hundred and two manuscripts were screened, 69 were downloaded and 21 met criteria to be included in this review. The articles were evaluated for symptomatic trends and initial evaluation work-up primarily focusing on inner-ear barotrauma (IEBt) and inner ear decompression sickness (inner ear DCS). The trends for IEBt were compared to typical inner ear DCS presentation based on large study inner ear DCS results consistent with the plethora of research available. Finally, the HOOYAH tool was developed to assist the receiving provider to better determine the most likely diagnosis and thus initiate appropriate treatment. The HOOYAH tool is comprised of the following: 1) H: hard to clear; 2) O: onset of symptoms; 3) O: otoscopic exam; 4) Y: your dive profile; 5) A: additional symptoms and 6) H: hearing. For each of these components, the typical presentation is described allowing the provider better to discern the correct diagnosis. CONCLUSION: The diagnosis of IEBt remains difficult to define short of visualization through surgical exploration. Early treatment is defined by conservative management with a subsequent observational period to determine symptomatic resolution and need for surgery. However, a similar differential diagnosis is inner ear DCS which requires early recompression. The HOOYAH tool provides a method for assisting the provider in forming a more confident decision regarding the underlying pathology and facilitation of the appropriate treatment.

Shykoff BE, Florian JP. Pulmonary effects of repeated six-hour normoxic and hyperoxic dives. PLoS One. 2018 Sep 7;13(9):e0202892. doi: 10.1371/journal.pone.0202892. eCollection 2018.

This study examines differential effects of immersion, elevated oxygen partial pressure, and exercise on pulmonary function after series of five daily six-hour dives at 130 kPa (1.3 ATA), with 18 hours between dives. Five cohorts of 10 to 14 divers participated. The exposure phases were resting while breathing O₂ or air in the water ("wetO₂", "wetAir") or O₂ in the hyperbaric chamber ("dryO₂"), and exercise in the water while breathing O₂ or

air ("wetO₂X", "wetAirX"). Respiratory symptoms were recorded during and after each dive, and pulmonary function (forced flow-volume) was measured twice at baseline before diving, after each dive both immediately and on the following morning, and three days post diving ("Day+3"). The incidences of symptoms and of flow volume changes from baseline greater than normal limits ("ΔFV") were assessed, as were mean ΔFV. The parameters examined were forced vital capacity (FVC), forced expired volume in 1 second (FEV₁), and forced expired flow from 25% to 75% volume expired (FEF₂₅₋₇₅). The phases ranked from greatest to least fraction of diver-days with symptoms were wetO₂X (56%) > dryO₂ (42%) > wetO₂ (13%) > [wetAir (2%) or wetAirX (1%)] (p<0.05). FEV₁ and FEF₂₅₋₇₅ were depressed in the morning following wetO₂ and wetO₂X and on Day+3 after and wetO₂X, but increased immediately following each wetAirX dive. O₂ exposures caused symptoms and ΔFV suggestive of pulmonary oxygen toxicity, exacerbated by exercise. Indices of small airway function showed late (17-hour) post-O₂ exposure deficits, but, particularly with exercise, improvement was evident early after exposure with or without O₂. FEF₂₅₋₇₅ and FEV₁ remained depressed on Day+3 after wetO₂ and wetO₂X.

Tenenhaus M, Gaid NA, Hayes S, Foubert P, Grover I. Injection of SVF combined with HBO2 improves viability of unfavorably designed flaps. Undersea Hyperb Med. 2018;45(4):381-8.

PURPOSE: Soft-tissue reconstruction is complicated by ischemia and reperfusion injury. Animal trials have documented the independent healing benefits of hyperbaric oxygen preconditioning (HBOP) and stem cell delivery in cutaneous flaps. We explored the role of HBOP and stem cell delivery in flap preconditioning and survival. **METHODS:** We designed a randomized controlled trial to assess the effects of hyperbaric oxygen preconditioning and stromal vascular fraction (SVF) delivery on flap survival. Of the first 24 guinea pigs, six received neither HBOP nor injections, and six underwent HBOP without injections. Of the remaining 12 animals, six received SVF or saline injections in the absence of HBOP. The final six animals received autologous SVF injections or saline injections followed by four HBOP treatments. To enhance clinical relevance, a group of 6 animals underwent HBOP prior to SVF or saline injections. Thereafter, an unfavorably designed cutaneous flap was elevated and assessed via study-blinded observer, as well as by quantification of TUNEL-positive cells. **RESULTS:** Distal necrosis of the tissue flap was more extensive in the no-intervention group (45% of flap). Flaps treated with HBOP only and those treated with SVF injections demonstrated only 38.2% and 27.1% distal necrosis. The most significant difference occurred in the combination HBOP and SVF group, where distal necrosis was only 21.1% of the flap (p≤0.05). SVF delivery

immediately prior to flap elevation further minimized distal necrosis of the flap to 15.6%. These findings were mirrored by the TUNEL assay. **CONCLUSIONS:** Combining HBOP and SVF improves flap viability.

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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