Letters to the Editor

HBO Evidence website

Dear Editor,

As many of your readers may be aware, I have been having trouble maintaining the HBO Evidence site <www.hboevidence.com> over the last 18 months. This is partly because of the inevitable evolution of page-writing software and partly to the equally inevitable problems generated by hospital firewalls that seem designed to prevent employees from posting useful information on the internet. Our pages were also rather too often under cyber attack, making the discussion forums unworkable.

While we have moved the site behind the University of New South Wales (UNSW) defences in order to prevent its corruption, it is unfortunately no longer possible to update the contents – rendering it rather purposeless.

To this end, I have been working over the last 15 months to re-write the site as a wiki under the auspices of the UNSW 'wikispaces' group of sites. This has several advantages, including affording a high level of protection, an enhanced ability to quickly and easily update the contents, the ability to allow others to easily update contents if required and a more secure discussion facility.

I am pleased to advise, therefore, that the new site is now open for business. The new address is:
<http://hboevidence.unsw.wikispaces.net/>.

Interested readers should reset their favourites list to this address instead of the old <www.hboevidence.com>. The site remains dedicated to presenting useful summaries of all the randomised trials in both diving and hyperbaric medicine.

When you first visit the site, you will be asked if you wish to become a member. Membership is not required to view the pages, but anyone interested in assisting us with adding to the content of the site and keeping it up to date, can apply to join us by submitting the membership request.

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Safety of deep apneic diving

Dear Editor,

We agree with Dr Walker's concerns about risks associated with breath-hold diving, voiced after Professor Schagatay's first review in 2009 in this journal.[1,2] We thank Professor Schagatay for her very thorough reviews, but only agree in part with her view that reporting increases safety, as breath-hold deep diving per se is unsafe.[2,3,4] To weave a scientific lifebelt for this high-risk activity is inappropriate. We also doubt that uncritical reporting increases safety. We also believe that it is scientifically unsound to recommend so-called 'proper techniques for preparation and performance' to achieve 'maximal performance'. We list below some of the serious pitfalls that could evolve from reading parts of the most recent review.[4]

Competitors in static/dynamic apnea experience extended hypoxia. While acutely elevated levels of a marker of brain damage may not be of major relevance, long-term, possibly cumulative effects must be suspected.[5]

If extended breath-holding alone poses serious risks for unconsciousness, brain injury and death,[6] then breath-hold deep diving adds risks associated with the effect of increased ambient pressure on gas volumes and increased partial pressures.

If a coach advises the use of new hydrodynamic goggles, almost frictionless dolphin-skinned swim suits and more efficient power fins, then he does not harm the athlete. If the ambitious breath-hold deep diving athlete reads about 'tricks' on how to fool physics, then he is seriously endangered. After reading *Training, preparation and equalization to avoid barotrauma* (p. 220ff.) he feels encouraged to perfect his glossopharyngeal insufflation (GI) and exsufflation (GE) to prevent descent barotrauma,[4] but he would thus go from bad to worse, as such techniques can do harm. Describing techniques without describing possible deleterious consequences seems too short-sighted.

GI might considerably increase intrathoracic pressures (up to 80 cmH_2O) with an increased risk of pulmonary barotraumas and arterial gas embolism.[7] In turn, increased intrathoracic pressures will likely impede venous return, inducing hypotension with consequences varying from dizziness to fainting just prior to diving.

Submersion shifts blood towards the chest, and more blood is shifted as ambient pressure increases. Thus, all thoracic structures with a high compliance are considerably enlarged. In consequence, chest sonography frequently documents pulmonary oedema after immersion,[8] and great depths are associated with the risk of pulmonary barotrauma (lung squeeze). GE can seemingly increase the risk of lung squeeze by taking some mouth-fills of air from the lungs

and should not be presented by a coach without its serious hazards being explained. While haemoptysis is the visible consequence of acute pulmonary barotrauma, any less severe damage might remain subclinical. Hence, regular competitive apnea diving over a few seasons might carry a chronic cardiopulmonary risk leading from early functional changes to the manifestation of pulmonary hypertension.[9]

Regarding lung squeeze, it should be noted that involuntary contractions of the thorax and diaphragm can produce waves of negative pressure.[10] Once intrathoracic pressure is already negative at great depth, additional negative pressure waves might well damage the pulmonary capillaries.

Finally, the risk of decompression sickness (DCS) after breath-hold dives has been considered by Dr Schagatay. After a breath-hold diver has suffered from cerebral DCS, such athletes should only perform extensive breath-hold activities near a treatment chamber.

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Reply: Safety will increase with knowledge

Dear Editor,

Thank you for the opportunity to respond to Dr Schipke and his colleagues. It seems these writers are responding to a paper promoting extreme breath-hold diving. This is not the case; I am simply describing what people do and attempting to understand their physiology. Since part of the scientific community decided to stop reporting on the physiology behind deep diving in the 1990s, record setting has continued evolving at a tremendous pace. Thus, the lack of involvement of scientists has had little relevance to recruitment to these sports. Turning a blind eye to these activities simply does not work. My target audiences for the reviews were both advanced freedivers and researchers, and my aim to make diving safer. Many divers have appreciated the papers for telling them more about the risks they face. Finally, there is a response from some researchers, albeit a negative one: I was hoping to stimulate renewed interest in researching these factors and potential risks, not a recommendation of 'non-reporting' and neglect.

I share with the writers their concern that these activities are potentially dangerous, but believe they could be made safer by a better understanding of the real and imagined risks. I have also come to realise when studying these divers (after initially sharing the view of the writers that these divers must be careless daredevils) that these sports men and women are not there to take risks but to limit them. Just like climbers using advanced safety systems, they try to reduce the risks to a minimum. The safety routines of these sports can be learned at serious climbing or diving clubs. But how could divers avoid risks unknown to them? This was well put recently by a world record holder in deep diving when thanking me after reading my last paper:

> "*Freediving, just like climbing, is not about taking risks, but on the contrary about how to avoid risk. That's why we need researchers who find out and tell us which the major risks are when we dive, and what isn't a risk. If nobody does – then we are exposed to risk!*"

Many sports and other activities are 'inherently dangerous', but this does not deter us from trying to make them safer.