Abstract title: Diving Practices in Technical Divers' Community and Behaviour towards Self-reported Unusual Symptoms.

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Abstract: **Introduction:** Deep diving using helium-mixed-gas becomes increasingly common. It frequently involves complex logistics and decisional compromises. The characteristics, habits, or the inherent risks experience remain poorly documented. The purpose of this study was to make an epidemiologic inventory of practices and diving related incidents in technical diving community.

Methods: An international online survey was disseminated on social networks aimed at certified trimix diver. It focused on demographic data, diving experience and their dive management. Self-reported unusual symptoms, treatment, and outcome after trimix dives were also investigated.

Results: 558 questionnaires were analyzed. Most of respondents were male (92 %), mostly aged over 46 years (61 %) with a high level of certification and for recreational purpose. One or more diving risk factors was declared by 42 % of them. The use of rebreather was dominant (79 % at least occasionally). The decompression was mostly managed by gas content model (85 %) using gradient factor adjustment. The dive plan varied depending on the dive profiles with a very high inter-individual variability. Gas density at depth frequently exceeded the current recommendations (Table 1). Ten percent declared having experienced symptoms suggestive of gas toxicity, mainly linked to nitrogen narcosis. Thirty-three percent of divers reported experiencing evocative symptoms of diving related incidents (i.e. in-water loss of consciousness, high nervous pressure syndrome, decompression sickness (DCS) or breathing trouble) among which 61 % with certainty. In 47 % of events, divers did not report to have initiated any treatment. Regardless of the type of evocative DCS symptoms and the degree of certainty (n = 254), normobaric oxygen was received in 42 % of events and medical advice was sought in 23 %. Sixteen percent were treated with hyperbaric oxygen. Only two percent have declared probably suffering from long-lasting sequels.

Table 1. Respired gas densities - repartition by diving equipment

Breathing appartus	Overall N (%)	> 5.2g/l n (n\N%)	> 6.2g/l n (n\N%)	Overall N (n\N%)	> 5.2g/l n (n\N%)	> 6.2g/l n (n\N%)	Overall N (n\N%)	> 5.2g/l n (n\N%)	> 6.2g/l n (n\N%)
Rebreather	301 (54.8)	181 (60.1)	27 (9)	234 (60.5)	200 (85.5)	113 (48.3)	186 (62.4)	172 (92.5)	80 (43)
Open Circuit	113 (20.6)	85 (75.2)	21 (18.6)	41 (10.6)	36 (87.8)	30 (73.2)	21 (7.1)	21 (100)	17 (81)
Both (OC and RE)	135 (24.6)	69 (51.1)	14 (10.4)	112 (28.9)	75 (67)	48 (42.9)	91 (30.5)	67 (73.6)	33 (36.3)
Sum	549 (100)	335 (61)	62 (11.3)	387 (100)	311 (80.4)	191 (49.4)	298 (100)	260 (87.3)	130 (43.6)

Conclusion: The diversity of practices highlights the lack of strong scientific data supporting them. The accident rate in mixed-gas diving could be higher than in recreational diving, though mostly with mild severity. Treatment seems to be remained neglected despite the high level of knowledge of divers. However, the prognosis seems to be most often favorable. It appears essential to continue research into decompression and physiological effects of these dives. Awareness and education efforts in diving first aid must be continued among this exposed community.