Preliminary analysis of DAN Europe DSL DB and gradient factor evaluations

Introduction: The current large number of dives per year requires in-depth epidemiological analysis. The DAN Europe DSL database (DB) was analysed aiming at comparing its data with tissue saturation values according to Buhlmann ZH16 Model. An analysis of the relationship between ambient pressure and allowed gradient factor (GF) as predicted by Buhlmann ZH16 was completed.

Materials and Methods: An original database format (DAN DL7) was developed for statistical analysis. Information about anthropometric data, breathing gas used, equipment malfunctions, medical history was included. An original software was developed for the analysis of GF values.

Results: 3000 divers (2460 male, 540 female; mean age 37,66) completed 39.944 dives (mean depth 28,03 m +/- 13,75m – mean dive time 46,02 +/- 4,6 min) 91,30% used air, 5,14% nitrox. 0,48% trimix, whilst for 3,08% data are missing. The use or compartimental vs bubble decompression algorithms was equally distributed (50-50 approximately). Preliminary analysis has shown that for each tissue, at any value of the ambient pressure, the supersaturation calculated on the basis of the given profile is constantly significantly lower than the maximum allowed supersaturation value as predicted by the Buhlmann ZH16 model. 181 DCS cases were recorded (0.5%), of which only 20% showed a GF > 80%, whilst the majority implied lower supersaturation and GF than expected in a DCS case.

Conclusion:

Most of the analysed dives lie in the “safe zone” i.e. Divers tend to dive very conservatively. Average ascent speed is lower than recommended by current algorithms. The reliability of current algorithms shows “grey areas” as to ability to predict DCS that need further research and a more physiological approach to decompression. The DAN Europe DSL DB analysis is providing important data to improve safety in recreational diving.