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Protection and resque of marine animals: The role, significance and contribution of scuba diving doctors of veterinary medicine

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Abstract:

Interest in scuba diving with doctors of veterinary medicine (DVM) has existed for many years, and a certain number has been accredited with various scuba diving expertise levels, from beginners to instructors, in Serbia as well as abroad. Scuba diving (utilizing oxygen tanks) which enables the divers to breathe underwater is significant for DVM for several reasons. On the one hand, DVM divers form part of expert teams of numerous scientific expeditions researching the underwater world of seas and oceans, while on the other they participate individually (often as volunteers) or in teams in protection and rescue of sea animals projects, most often sea mammals, sea turtles, sea corals, fish and shellfish. Volunteer mixed professional teams are part of regular research or rescue projects in seas or oceans, and they are also engaged during emergency situations when marine animals need rescuing, or other living beings on the sea and underwater. Utilizing scuba diving DVM's also includes regular activities connected to care and benefit of marine animals, especially when it comes to endangered species, and also marine species used for breeding purposes (aquaculture). Having in mind the great economic significance of said breeding species of marine animals, the care of their health is primarily given to DVM's, especially those holding scuba diving titles. Thanks to their knowledge and expertise, scuba diving DVM's play an important role in this area by contributing professionally to the overall maintenance of the aquatory (esp. contamination and pollution), as well as the health and benefit of marine life and activities connected to its protection and rescue. The aim of this paper is to point out emphatically the role and significance of scuba diving DVM's in protecting and rescuing marine animals in order to maintain optimal conditions for their physiological growth, development and survival.

Key Words: scuba diving doctors of veterinary medicine (DVM), contribution, marine animals, protection, rescue

Introduction

Since the dawn of time man has shown interest in the underwater world of seas and oceans, which never left him despite many casualties and which will surely continue in to the future. Humans needed a lot of time to overcome technical challenges which would enable them to spend longer underwater and really get to know the secrets of seas and oceans. From the initial free diving man has developed diving gear leading to contemporary equipment, various technical vessels and modern gadgets – mini submarines, robots and underwater drones. Of course,

diving with oxygen tanks (scuba diving) holds a special place in this developmental process. Interest in scuba diving with students and doctors of veterinary medicine is well known and established, and a number of doctors have in the meantime acquired various scuba diving titles reflecting various levels of expertise, from beginner to instructors. Scuba diving tanks hold compressed air and a pressure regulator enables normal breathing underwater. Scuba diving has hugely gained in popularity in the second half of the 20th century thanks among other things to the famous French officer, explorer and inventor Jacques Cousteau, an admirer of seas and oceans, whose exploratory ventures have also included the Serbian portion of the Danube during the previous century. Scuba diving as a skill and expertise is hugely significant for DVM's, and for various reasons. On the one hand, scuba diving DVN's are part of mixed expert teams of many scientific expeditions dealing with the research of the underwater world of seas and oceans. On the other, they participate individually (often as volunteers) or in teams in protection and rescue of sea animals: sea mammals, sea turtles, sea corals, fish and shellfish. Volunteer mixed professional teams are part of regular research or rescue projects in seas or oceans, and they are also engaged during emergency situations when marine animals need rescuing, or other living beings on the sea and underwater. Utilizing scuba diving DVM's also includes regular activities connected to care and benefit of marine animals, especially when it comes to endangered species, and also marine species used for breeding purposes (aquaculture). Having in mind the great economic significance of said breeding species of marine animals, the care of their health is unimaginable without the presence of DVM's, especially those holding scuba diving titles, who are thus able to bring forth their skills and play a significant role through their professional contribution in activities of protection and rescue of marine animals. This is especially evident during emergency situations, when doctors themselves are often exposed to various dangers and risks, whether the case might include the endangerment of health and life of marine animals or their aquatory has been destroyed through pollution of different kinds, from plastic waste within the ecosystem to accidental oil spillage to radiological, chemical or biological contamination.

Scuba diving has in the last several decades become more and more popular among underwater world enthusiasts, and it involves diving with the aid of tanks holding compressed regular air to be used under water. Regular outside air we breathe is compressed into diving tanks through a machine called the compressor. The compressor (best if electrically powered) has to be held far away from the path of various motor vehicles and other air pollutants (chemical plants, fire and smoke, etc.), so as to prevent the polluted air from being compressed into diving tanks and later breathed by the divers in the deep, underwater. Consequences for divers who breathe such polluted air can be numerous, from dizziness and vomiting to loss of consciousness and even death, which has been known to happen. The diving tanks are filled under the pressure of 200 bar (maximum 300 bar) and they must be attested, after which they are ready for use, which can also be followed on the compressor's manometer. Checking the pressure in the diving tank also has to be performed before every dive, utilizing a manual manometer or the manometer placed on the tank itself while the diver is still on the surface of the water. Scuba diving can be performed with one diving tank, two paired tanks, and three or more as reserves, all depending on the planned depth of diving and time spent underwater, including the time required to decompress before diving out. At sea, it is considered best to dive within limits of safety, i.e. 30 meters of depth, with decompression at 3 meters for 5 minutes and before the final dive-out to the surface. All of this is carefully defined in the detailed diving plan which has to be followed through without exceptions so as to avoid potential diving accidents. Diving to greater depths generally requires a shorter period spend underwater and more decompression pauses at adequate depths before diving out to the surface, and every diving experience needs to be carefully planned in advance. Scuba diving in lakes or at greater altitudes, in underwater caves and such, has its own specificities and differs from diving in the open sea or ocean. However, regardless of the location, the rules set out by the host country need to be properly observed,

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as well as the diving plan. The basic divers' rule especially needs to be observed – one never dives alone!

Scuba diving the way we know it today was rendered possible by the famous French sea and ocean explorer Jacques Cousteau. Nowadays scuba diving teams own the most up-to-date diving equipment which enables them to spend time under waters of the Pacific, the Atlantic, and the Indian Oceans and all the way to the North and South Poles. The diving gear generally comprises diving tanks, a two-degree hydrostatic regulator, buoyancy calculator, dry, semi-dry or wet diving suits of various thickness, swimfins, breathing snorkel, lead weights, water-resistant watch, knife, signal buoy, depth meter, compass, battery-powered flashlight, ordinary diving mask with or without special sight lenses, Full-face mask, as well as communications equipment for keeping in touch with men on the surface, in the air or in vessels, and a life-jacket. Aside from this state-of-the art handheld computers and sensors are available to equip the divers with necessary information underwater. To achieve an easier movement various gadgets have been developed, such as mini submarines, underwater drones and other dedicated inventions.

Technological advancement have made it possible for scientists and inventors to develop new devices for scouting and monitoring of the state of aquatory, especially when it comes to pollution (contamination) of different sorts. There have also been developments in equipment for tracking and locating of marine animals (e.g. fish-finder). In this way scientists are able to achieve a much better insight into the general health and benefit of the animals. There are also devices – senders and mini cameras which can be attached or glued to certain parts of sea animals. These devices emit various data as signals through built-in sensors. They enable satellite tracking (telemetry) of animal movements as well as the creation of video recordings underwater, measuring the seawater temperature, the depth at which the animal swims, what it uses for food and which are its natural predators. One can also observe the general health status of the animal, whether it is being attacked, caught in discarded fishermen nets or tools, whether it has swallowed a hook or if it is hurt – which leads to conclusions of whether the animal needs to be rescued, if it is in peril of being run aground, if it has perished, or it has been using food contaminated by plastic waste. What can also be determined is the level of pollution of the sea, the statistics concerning sea life, the state of corals and coral reefs, as well as numerous other data which until recently there was no adequate way of obtaining.

There are various motives for amateurs as well as experts of different profiles to wish to learn to scuba dive. Some do it out of pure curiosity, some for material gain, others for sports and recreation, and some because scuba diving reveals new possibilities to expand their professional knowledge and skills. Excluding this, there are several professions which couldn't be conceived let alone survive without scuba diving as an integral part of their concept (marine biology, ichtyology, underwater archaeology, etc.), or which utilize scuba diving as an important factor in the performance of their basic professional demands. In any case, the fundamental condition is that those professionals need to gain proficiency in diving skills to render their stay, research or work underwater safe. It is a little known fact that Serbia, although landlocked, boasts many registered active scuba diving clubs and a number of divers of different diving categories. A significant number of diving instructors, some of whom are women, are amongst the best in the world and are well-respected of the worldwide diving community. Through completion of professionally implemented and conscientious training in scuba diving clubs and associations several diving titles can be obtained – from beginners, to full instructors. In order to become a scuba diver, a person needs to complete the training and pass the exam according to the CMAS, SDI or PADI systems. In Serbia this exam can be taken at any club which is a member of SOPAS (Serbian Association of Organizations of Underwater Activities). These titles are obtained by students and doctors of veterinary medicine who intend to further their careers in health and benefit of marine animals, as well as in their biological protection and rescue. There are numerous areas, professions and institutions which require completed scuba diving training for

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doctors of veterinary medicine, such as:

- Aquaculture, i.e. breeding and health protection of open sea, river and lake fish; breeding and health protection of fishpond fish; breeding and health protection of shellfish; ichthyology,
- Work on research projects organized by the Faculties and Institutes for Marine Biology, worldwide,
- Work at Faculties of veterinary Medicine in Europe and the world over, and acquiring of suitable academic titles,
- Work in Institutes for Ecology and other ecological organizations (research projects on health protection of fish, shellfish and protection and rescue of marine animals),
- Work in the Army Services or Police Departments when it comes to protecting the health of marine life trained for various military needs (seals, dolphins, etc.)
- In dolphinariums and aquariums of bigger seaside cities world over,
- In Zoos which keep sea animals (sharks, seals, dolphins, etc.),
- Work in marine national parks on the Pacific, Atlantic, the Mediterranean, Indian Ocean and other seas,
- In larger marinas which possess veterinary practices for treating animals – pets brought by yacht and boat owners bring to vacations,
- In bigger seaside or lakeside hotels with so called "seasonal" veterinary practices, for treatment and care of pets kept by tourists,
- On bigger ships – cruisers, which are "pet-friendly" and are required to have a veterinarian on board as a crew member with his team – i.e. the floating veterinary practice,
- In Agencies for Protection and Rescue of (marine) animals, world over,
- Work in certain government departments and organizations during emergency situations when health of the fish fund at sea, in rivers and lakes is in jeopardy (radiological, chemical or biological contamination, or general aquatory pollution).

Considering all the above, the significance, role and position of scuba diving DVM's have already been recognized when it comes to survival, benefit, care and protection of life and health of marine animals, including their protection and rescue in emergency situations and events, especially as a number of species is already facing extinction. Therefore scuba diving doctors of veterinary medicine, and the whole veterinary profession can and should point out these active issues and offer adequate and timely suggestions and solutions.

Conclusion

The rapid expansion of human interest in the underwater world of seas and oceans has been a consequence of scientific and technological advances in underwater research. Closely connected to this is scuba diving as a discipline. This type of diving has opened up many new possibilities to learn the secrets of seas and oceans and their flora and fauna. Thanks to scuba diving new advances were enabled in the fields of several wide and narrow scientific areas, including veterinary medicine. Doctors and students of veterinary medicine who have been able to gain the necessary scuba diving skills have opened up new chances to begin, continue and expand their professional careers when it comes to marine animals, i.e care of their survival, health, benefits, protection and rescue. As the significance, role and contribution of scuba diving doctors of veterinary medicine have already been recognized throughout the world in the past, it is expected that the appreciation of their value will continue to grow in the future.

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