Exploring the Cosmos with Telemedicine

If you've ever stood in your backyard on a summer night and looked up at the glittering cosmos – or debated the merits of *Star Trek*'s USS Enterprise vs. *Star War*'s Millennium Falcon – you've probably wondered how far we'll penetrate the mysteries of space in our lifetime. In some ways, it seems the impossible dream. But Dr. Marc O Griofa believes that we could expand our cosmic achievements within this century, with telemedicine playing an important role.

"The history of humankind is punctuated by periods of exploration that almost define who we are," he says. "Going beyond our planet is our core DNA. Without pushing the envelope, we're stagnant as a species. Space exploration is an integral part of human development – and telemedicine is an integral part of space exploration."

Meet Dr. O Griofa, a surgeon who's played pivotal roles with the Space Shuttle, the International Space Station, the U.S. Veterans Hospital Administration and U.S. Department of Defense. He talked to GlobalMed about why telemedicine is creating a paradigm shift in medicine, how it's being used in current space missions and why it could expand our capacity for interplanetary travel.

Turning Science Fiction into Science Fact

"I've wanted to walk on the moon since I was nine years old," says Dr. O Griofa of his interest in space. But he wasn't entirely celestial: "I'm also a big fan of blood and guts."

Those interests led to a career in emergency medicine, one that included the first double lung transplant surgery in Ireland. Dr. O Griofa, who's trained Special Operation Forces, Navy Seals, Green Berets and the Las Vegas SWAT team in combat medicine, quickly discovered the value of telemedicine in extreme conditions. "If someone is injured in Afghanistan, medics in the field have a short time to treat them before a gunshot wound becomes septic or organs start to shut down," he says. "Telemedicine creates a conduit from the field to a provider or surgeon on the other end."

Beyond emergency medicine, Dr. O Griofa believes that virtual care is essential to solving current barriers to care.

"Telemedicine is going to change face of healthcare," he predicts. "Right now healthcare is a black hole. You could pump in a billion dollars and find very few of those dollars will touch an individual patient. We need to rethink our approach. Otherwise the industry will collapse under its own weight. Telemedicine can create a paradigm shift that's not just necessary but incumbent on everyone who practices medicine."

Noting the evolution of telemedicine capabilities, Dr. O Griofa sees parallels between robotic surgery and telemedicine. "There were pitfalls and improvements that came along with robotic surgery," he says. "It was such a huge leap forward, what we could do without being physically in the surgery theatre with the patient. Even 20 years ago, it seemed like science fiction. Now that we're using telemedicine to be so disruptive, I see the same leaps and bounds in innovation. I think telemedicine will drive the industry forward for years to come."

"Science fiction has become science fact," he says.

From the Ocean Floor to the Moon

Dr. O Griofa's expertise led him to working with the Space Shuttle's triage and trauma team at Kennedy Space Center. A trained diving medical officer, he then applied his talents to NASA's Aquarius Undersea Habitat, an underwater research station off the Florida Keys. Here astronauts (called acquanauts) train underwater for future space missions. "From 6 a.m. to 9 p.m., astronauts do all these experiments and some of those include medical procedures and using technology," he recalls. "I worked with them as a diver, physician and scientist, helping them train to go into space."

Currently NASA uses telemedicine solutions for consults, but Dr. O Griofa believes that deeper telemedicine adoption in space is inevitable.

“There’s no full clinical staff in space and little advanced diagnostic equipment on board,” he points out. “If an astronaut develops chest pain, we need to know – is it a cardiac event or is it indigestion from too much Tabasco sauce and rehydrated food? But the International Space Station is 254 miles above the earth. It would take 24 hours and millions of dollars to get a sick astronaut back to earth.”

That’s where telemedicine can help, by using data-driven devices to diagnose an astronaut’s medical issues and consult with physicians on Earth. “It’s never going to replace the doctor on the ground,” Dr. O Griofa says. “But telemedicine improves medical situational awareness and helps providers make more informed decisions and treatments.”

Taking Telemedicine to The Final Frontier

Speculating on space travel is exciting, whether it’s investigating the earth-like exoplanets discovered by NASA’s Kepler space telescope or contemplating a mission into the icy oceans of Jupiter’s moon Europa. Most people are aware that barriers like cosmic radiation and the stressors of space travel mean that our AI children will take long interplanetary journeys on our behalf.

Yet telemedicine can help human expeditions go further than ever before.

“One of biggest conversations we’ll face in the next 100 years is, do we put a man or woman on Mars and how do we establish meaningful civilization beyond our own planet?” Dr. O Griofa says. “In the next generation capsule, if we go to Mars and moon, why wouldn’t we have telemedicine?”

Beyond Our Cosmic Backyard

Space has inspired some of our finest writers like Isaac Asimov and Ursula Le Guin, as well as Hollywood odysseys like *Star Trek* and *2001: Space Odyssey.* Now telemedicine may bring our most audacious dreams within reach by clinically supporting a new generation of cosmic explorers. If that seems like a stretch, consider the words of sci-fi visionary Ray Bradbury, who called humanity “an impossibility in an impossible universe.” From the days of our ancestors drawing in Indonesian caves, humanity has evolved to build skyscrapers, compose sonatas, cure diseases and walk on the moon. Our voyage into the universe is just beginning.