



American Healthcare Professionals and Friends for Medicine in Israel

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A headache may signal simply stress or be the call of a cancer alert. Pain in your back may be garden-variety arthritis or a spinal cord tumor that could leave you paralyzed.

Dr. Gal Yaniv just completed a year at Yale University's school of medicine, where he read 40 to 60 brain, head, neck and spinal system scans a day, learning to tell the difference. He was a 2016-2017 APF Clinical Fellow in Diagnostic Neuroradiology.

Diagnostic neuroradiology is the required first step in his post-doctoral training to become an interventional neuroradiologist. He will complete the final steps at another U.S. program.

Neuroradiology is a subspecialty of radiology focusing on the diagnosis and characterization of abnormalities of the central and peripheral nervous system, spine and head and neck using neuroimaging techniques.

Primary imaging modalities include computed tomography (CT) and magnetic resonance imaging (MRI) as well as ultrasound, fluoroscopy (a type of medical imaging that shows a continuous X-ray image on a monitor, much like an X-ray "movie") and angiography (X-rays of blood vessels using a contrast agent). Plain radiography is used on a limited basis.

These scans allow neuroradiologists to diagnose strokes, tumors, genetic conditions, aneurysms, Alzheimer's disease and many other causes of neurological dysfunction, including trauma from injury. "They create maps of the central nervous system with which we navigate. And once we reach the area of interest, we deploy our devices and or materials for such procedures as removing blood clots and tumors," Yaniv says.

"You're dealing with the most important organ in the body. The one that matters the most. Your personality, your identity, your independence are engulfed in this small organ. It's very important to be very accurate about it, as best as we can. And this can start with a scan.

"It's a very demanding profession. The brain and spine are unlike any other place in the body. Elsewhere you have a larger margin for error.

"The brain does not tolerate mistakes," he says. "The smallest mistake can leave a person unable to speak, move his hand or remember who he is. These are very grave consequences.

Even the heart can tolerate a mistake and a correction. In the brain, once you kill something, there's nothing else to do.

"The same thing applies to the spine. Damage to a very small spinal artery can have a person go in walking and leave without being able to control a limb.

"You must know exactly what you are looking at on a scan."

Reading a scan can take from a few minutes to an hour, depending on lots of factors including modality and whether a reading is positive or negative. "Usually the most time-consuming scans are sophisticated MRI's which include multiple sequences of the head and spine with and without contrast (dye that enhances the scan). Unfortunately these are sometimes very emergent scans, with both physician and patient awaiting results."

Was it necessary to leave Israel for this educational experience?

"Yes. Such fellowship offerings are starting in Israel, but they really are in their infancy. And they don't replace the chance to meet and learn from people with experience from all over the world and from these very busy and diverse programs that we just don't have in Israel. This is what helps medicine flourish, really."

According to Yaniv, a day in Yale's diagnostic neuroradiology fellowship starts at about 7:30 a.m. and ends at about 6 p.m. The day includes reading scans, doing procedures, studying, attending conferences and educational seminars and preparing presentations. Nine fellows share "call." It's every week, once a week, by yourself, from late afternoon until early morning. Every few weeks there's an entire weekend – Friday through Monday -- on call with lots of scans to be read (as many as 200) and minor procedures to be performed. Procedures include biopsies and draining cerebral fluid under fluoroscopy. At Yale there are five hospitals to be staffed when on call.

Why Yale?

"It's one of the biggest programs and one of the best. You want to go where you are going to get lots and lots of experience doing the procedures you will be doing out in the world by yourself.

"It's one of the best ones mainly because of the great academics of Yale and the volume and variety of cases. The attendings are great mentors. It's a very academic place with a real emphasis on teaching."

Is it intense?

"YES!

"It is very stressful; as time goes by everyone is demanding more and more imaging for various reasons (including legal ones). I don't think that the production of radiologists can keep up with the demand."

Yaniv notes that scans affect not just patients, but caregivers too. "You can save lives of patients and those of the family as well. Take, for example, a

patient with a large stroke. His family will need to provide care for him – daily tasks of living, everything. But if we can precisely visualize the clot and remove it, we can save his life and the family's life. The impact is on a much larger scale than on just one patient."

No one and nothing in particular led the 39-year-old Herzliya native to medicine. "Very early on I was drawn to biology, biochemistry, biophysics and the like. But I can't remember any specific incident or person that made me decide on medicine as a career," he said. "I was just drawn to the medical work and the basic thought of helping people.

"I'm the only physician in my family, most are engineers and in high tech. I'm like the weirdo in the group."

After high school Yaniv joined Atuda, the prestigious IDF program allowing high school graduates to finish university prior to military service. He attended medical school at Technion in Haifa.

There he also completed a PhD in physiology and biochemistry, with a dissertation focusing on heart cell death. Yaniv thought he wanted to become an interventional cardiologist, a physician specially trained in non-surgical catheter-based procedures to diagnose and treat heart disease. "I always felt I was a surgical type, but not the open-heart kind."

He then did his internship at Chaim Sheba Medical Center at Tel HaShomer (near Tel Aviv). After which he entered the army as a physician in the well-known Special Forces infantry battalion Gadsar Givati -- and met his wife.

The Yaniv family of four includes Gal, wife Shira, 33, a lawyer and daughters Noga, 7 and Danielle, 3 ½.

They will stay in the U.S. two more years, while Dad completes a two-year-fellowship in interventional neuroradiology at New York hospital.

After about a year and a half Yaniv transferred to the Israeli navy's equivalent of a SEAL unit.

"I heard there was an opening and I love the ocean ('Gal' means 'wave' in Hebrew). This turned out to be one of the most influential parts of my life. As a physician in the unit you must know your military stuff; at the same time, you have to be their physician. You spend the first nine months just practicing to be a SEAL. It's a very weird experience for someone who's just finished med. school.

"After that you feel you can join the guys and help them with their missions. You get to do a lot of very interesting things in all kinds of places without passports, not much more of which I can discuss."

While in the navy Yaniv also led a classified research and development team for new devices. And he created methods for keeping the wounded alive in order to reach more sophisticated medical care. He also implemented strengthening and injury prevention programs for troop training and is considered a specialist in military medicine.

Yaniv is now also chief medical officer of aidoc, a start-up he helped found two years ago, that deals with artificial intelligence and imaging. "We are going to help radiologists read scans faster and more accurately." <https://aidoc.com/>

After three years in the navy Yaniv realized he no longer wanted to be an interventional cardiologist. He wanted to become an interventional radiologist. "It's more rigorous and a much wider area of interest for me, more organisms and pathologies.

So I started my residency, a five-year training program at Chaim Sheba, home of Israel's largest imaging center.

"But then I realized I was going to be bored and decided I wanted to be a brain specialist – I wanted to do things like catheterize the brain, treat the brain with no need for major surgery. So I changed my focus from interventional radiology to interventional *neuroradiology*."

Yaniv says interventional neuroradiology is a relatively new profession within medicine, about 40 years old. "It's even more challenging – just working within the central nervous system."

After Yale, the whole family moved to the Bronx so Yaniv could study this neuroradiology sub-specialty at Mt. Sinai Hospital. "It's another very intense fellowship, with days as long 18 to 20 hours." After New York, Yaniv will return to Chaim Sheba.

But when he is through with all his studies, Yaniv still plans to practice some diagnostic neuroradiology.

"I believe that diagnostic neuroradiology will, in the next few years, undergo tremendous technological changes, much more than any other medical field, which will make future radiologists central to patient care management. I will always want to be a part of it."

American Physicians Fellowship for Medicine in Israel

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