

WHAT IS THE ROSHI?

(Note: The Roshi is a type of EEG biofeedback, or neurofeedback device. We use this effective type of neurofeedback in our clinical practice www.strongu.com. In EEG biofeedback the patient sees a color display showing moment to moment changes in his or her brainwaves. He also hears a tone that comes on when he has the kind of brainwaves that will improve the way the brain works. The tone turns off when the level of the "helpful" brainwaves drops. Over time, the patient learns to control his or her brainwaves, and eventually doesn't need the biofeedback anymore.)

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At a booth in the corner of the exhibit hall something was happening that drew people from all over the big Doubletree hotel. It was October, 2001, at the annual convention of the International Society for Neuronal Regulation, a group dedicated to brain research and treatment. Held in Monterey, California that year, even the nearby ocean wasn't enough to keep people away from the corner booth, where the new Roshi beeped and flashed.

Scientists, physicians, psychologists, and therapists gathered around the booth, sometimes three deep, to see this new EEG biofeedback machine. In a hall filled with cutting edge neurofeedback computers, the Roshi was unique - the device with light goggles, a colorful spectral display, and the sometimes grudging smiles of those who experienced a session on it.

Chuck Davis, the Roshi's inventor, grinned as he looked at the eager faces around the booth. "I've worked long and hard for this," he thought to himself. And indeed, he had.

The Making of the Roshi

As a young man, Chuck Davis always found the brain fascinating, but his first loves were music and math. After working as a professional saxophone player for many years, Chuck ended up at the Motown record label, where he worked as a recording engineer. There he helped produce the Grammy nominated album, *Walkin' in Rhythm* by the Blackbyrds.

After his successful career at Motown, Chuck moved to California in the late 70's. He returned to the field he'd trained for in graduate school, working in R&D for Jet Propulsion Labs (JPL) in Pasadena, and for the aerospace giant, TRW. Successful in his career as a rocket scientist, Chuck's ongoing fascination with brain function drove him to look into neurofeedback. In 1979, he met Hershel Toomin Ph.D. in Los Angeles, and began working with Toomin designing EEG biofeedback devices.

But Chuck had a dream for his own machine. In 1988 he began writing the code for his first neurofeedback system. Three years later, after countless hours of work, he created the prototype for the Roshi. Early users reported impressive results with the machine, but Chuck Davis had to work hard to spread the word about his new device. Sometimes he felt that no one was listening.

Eventually, though, other neurofeedback practitioners heard about the Roshi. One of the early converts was Victoria Ibrac, M.D. Trained as a physician in her native Romania, Victoria also earned a PhD. in Immunology and Health Psychology. She moved to Los Angeles, after being invited to conduct research at USC's Cancer Research Laboratory.

When Victoria first met Chuck Davis, she was skeptical about the Roshi. Swallowing her doubts, she tried it, first on herself, and then on a few carefully selected patients. Impressed with the results, she began incorporating the Roshi into her burgeoning private neurofeedback practice in Pasadena, California.

To her surprise, Victoria found that patients who had previously trained on conventional neurofeedback devices made much faster progress when she began using the Roshi with them. The changes the Roshi triggered in her patients were so profound that Victoria purchased several of the new systems, and began using them with almost everyone who saw her for treatment. This led, eventually, to her clinical case studies and research on the Roshi system, which Ibrac presented at conferences and had published in biofeedback journals.

Another early Roshi adopter, Cory Hammond, Ph.D., reported similar benefits. A Professor of Rehabilitation Medicine at the University of Utah School of Medicine, Hammond found that the Roshi helped patients whom he hadn't been able to reach with other modalities. Soon he began seriously investigating the system, and conducting research on the Roshi's abilities.

Cory Hammond found, for instance, that Roshi treatment helped patients who were

referred to him with what is called “treatment resistant depression”. These patients had previously had the finest medical care, including multiple trials on antidepressants, but were still depressed. When these “hopeless cases” came to see Hammond, he initially gave them the MMPI, the “gold standard” of psychological tests. Then, after having 10-15 Roshi sessions, he administered the test to each patient again. The results showed significant reductions in the MMPI’s depression and anxiety scales among others.

Other Roshi pioneers, including Elsa Baehr at Northwestern University, contributed to the “buzz” about the new neurofeedback system.

Propelled by the research studies and clinical trials conducted by Victoria Ibrac and Cory Hammond, word about the Roshi began reaching other healthcare professionals. In 2001, Chuck Davis created the Roshi II, and displayed it at that corner booth at the ISNR conference in Monterey. Finally, after years of unheralded work, Chuck saw the Roshi begin to take off.

What the Roshi Does

So-called Light and Sound machines have been sold for over 20 years. They work according to a proven phenomenon of the brain, called “frequency following”. When the eyes, and thus the brain, “see” a light flashing at, say, 10 flashes per second (10 Hz), brainwaves tend to follow that frequency.

Thus, in response to the light, the brain exhibits more 10 Hz brainwave activity. This is called “entrainment”, because the brain entrains with or follows the frequency of the light. Neurologists (physicians who specialize in the brain and nervous system) use strobe lights to trigger the brain’s frequency following mechanism so that they can examine certain brainwave frequencies.

Light and Sound machines, using LED’s installed in goggles, emit light that is much less intense than a strobe. But they, too, work to entrain the brain so that it boosts certain frequencies.

Why is it helpful to enhance specific frequencies? Many brain disorders or problems are marked by “too much” (and/or too little) of certain brainwaves. For instance, most patients with Attention Deficit Disorder (ADD) have excess “slow” brainwaves, in the realm of 1-10 hz. And clients with depression and brain injury also tend to show surplus slow waves.

Anxiety, on the other hand, is often marked by excess “high” brainwaves, especially

those between 20 and 30 hz. So to treat ADD, for instance, the goggles on Light and Sound machines may flash 13-18 times per second (13-18 Hz) to entrain the brain, thus creating more of the higher frequency activity that helps people concentrate better.

Though the theory is sound, in reality, the brain doesn't always respond predictably to a given frequency of flashing light, because of the unique harmonics each brain creates in response to the lights. So although Light and Sound machines can be helpful, they may also trigger brainwaves that the user doesn't necessarily want to have more of.

What was needed was a system that could "read" how the brain was responding to the light, and change the light output in response to what the brain did. It wasn't, however, until Len Ochs, Ph.D., created his Flexyx system, that anyone paired light with neurofeedback (which is also called EEG biofeedback). Ochs' device broke new ground by creating a system utilizing light goggles whose flashes changed as the patient's brainwaves changed.

Fascinated by the Flexyx system, Chuck Davis worked to create something even more advanced. Thus, the Roshi's "discrete" setting was born. The "discrete" modality, according to Chuck, "trains on the spectral amplitudes, products, and differences between the hemispheres." Simply put, it could be set to "follow" the dominant frequency of the patient's brainwaves, changing as the frequency changed. Through this system, Chuck, and Len Ochs before him, addressed a problem that had prevented Light and Sound machines from being more effective.

But the truly revolutionary aspect of the Roshi was what Chuck called "complex-adaptive" visual stimulation. With the complex-adaptive modality Chuck says:

"The raw EEG is fed through an algorithm that treats the complex EEG as 'chaos' and modulates the LED's accordingly. Thus the intensities [of the lights] are constantly 'adapting'; to neuronal conditions, in realtime."

The brain is an unpredictable, complex, and "chaotic" system. The Roshi processes the brainwaves from this system using fractal math, then responds in milliseconds to changes in them. What the user sees in the light goggles is a complex, constantly changing flicker, based on changes in his or her own brainwaves. It's like the brain "seeing" itself.

Unlike earlier systems, the Roshi disentrains, as well as entraining brainwaves. Thus it can "downtrain", or reduce, certain frequencies, like the slow waves associated with ADD, as well as "uptraining", or increasing, the desired frequencies.

Though the Roshi is sold only to enhance peak performance, practitioners have found that other applications for this type of neurofeedback are numerous. Along with Hammond's research on depression, and Ibrac's with chronic pain, ADD, and stroke, among the most promising applications for the Roshi are in helping to treat anxiety, stroke, headaches, bipolar disorder, age-related cognitive slowing, and brain injuries.

Roshi practitioners universally report that sessions on the Roshi have helped brain injured patients function at levels that they thought they never would again. The treatment appears to "wake up" the brain. In my own practice I've worked with several patients who were unemployed because of brain injuries. Before treatment, each of these individuals had given up on ever working again. Yet, after Roshi therapy, all have returned to work.

One brain injured patient, unemployed at the start of treatment, started his own company after several months of Roshi work. His business is now so successful that he has had to hire several new employees and buy more equipment. If he had not had Roshi treatment, he would still be sitting at home each day, as he was before his sessions.

Roshi today... and tomorrow

Today, scores of healthcare professionals are using the Roshi neurofeedback system throughout the world. Many report that patients travel long distances to have Roshi treatment at their offices. Because of Chuck Davis and pioneer researchers and clinicians like Victoria Ibrac, M.D. and Cory Hammond, Ph.D., patients with brain injuries, ADD, depression, anxiety, and other disorders have a much better chance for recovery than they once did.

As for Chuck Davis? His long-time love affair with the Roshi isn't over yet. Stay tuned for new developments.

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