Chapter 27

Neurofeedback and me: the history

Merlyn Hurd

The early years

How did you get into this? This is a favorite question of clients and fellow clinicians alike. With any journey the start is hard to pin down. Mine, I believe, started when I was 10 or 11 years old and could not understand how it was Christian to forbid a black man and his family from living in my little town in Oklahoma. Questioning the minister on how that was all right almost got me another year of catechism study. My parents, being first born in America, stopped that edit cold. From this incident I learned to question and look for different ways to address whatever did not seem appropriate.

This led to another turning point when our firstborn was 3 years old. As a mixed race child (my husband was black), she had basically my very light skinned face and an afro

that was a good 6 inches high. Like any mother of the 60's we looked for a preschool. Across the street from our sixth floor walkup was the Bank Street College which had a full operating preschool. Denise, my little daughter, and I walked across and inquired about seeing the classroom. I had overdosed reading Marie Montessori so I knew what I was looking for. The lady informed us that parents would not understand the classroom activities so they did not permit viewing the classroom and then she said “besides, she wouldn't integrate the classroom anyway.” I stormed across the street and up the 6 flights and informed my husband I would not integrate any one's damn classroom and that we will build our own school.

At the same time 3 other couples had the same idea: one was a couple from Ireland; another was a black and white couple like us and the third was a writer for Life magazine. Together we proposed a bilingual Montessori school set in the lower east side which was heavily Spanish and black. We named it Escuela Montessori Pre School. None of us had the money to build a school, but we figured the federal government did. So off went the proposal and we were funded for a year. (The school still operates 55 years later).

Skip forward 4 years and while working for the city of NY Head sStart headquarters I was asked to develop bilingual preschools. Employing Dr. Vera John from Yeshiva University as a consultant and guide (she had assisted us in the fashioning of Escuela Montessori) we did just that. One day while on the phone discussing issues, I stated, “you probably would not be interested in me in the psychology PhD program”. Remember I was not in my 20's or early 30's so being accepted in a PhD program during those years was very iffy. She replied that the faculty had been talking about how to get me into the program. That was all it took. I entered the program in 1972 and graduated in 1980.

During the graduation ceremonies, I had my first whiff of biofeedback. At graduation the women next to me informed me her dissertation was on biofeedback, i.e. HRV, and blood pressure. I was intrigued, but

not enough to pursue it immediately. A year later I became a member of Arnold Lazarus' Manhattan Multimodal Institute. My first meeting with my supervisor and mentor was telling. He took from a shelf a box with a little wire attached and a tiny probe attached to the wire (See Fig. 27.1). He handed me the box and informed me I was to train him on it a week later at our next meeting. Casually, he mentioned I might want to read Barbara Brown's book Biofeedback (See Fig. 27.2–27.5).

Fig. 27.1 My original Thermal machine.

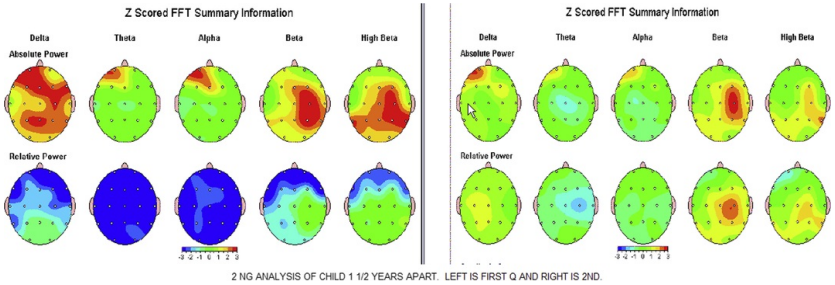

Fig. 27.2 Neuroguide Analysis of child 1 ½ years apart. Left is first Q and right is second.

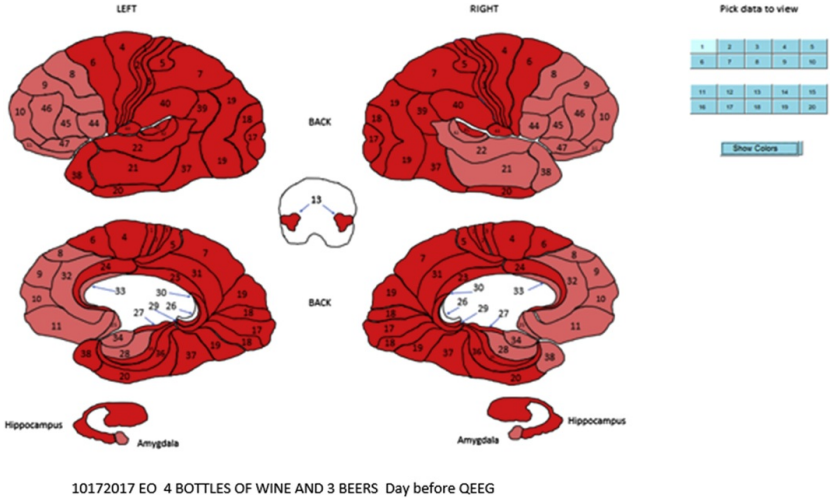

Fig. 27.3 First Q after he had consumed 4 bottles of wine and 3 bottles of beer, he informed me of this the next day, not the day of the acquisition.

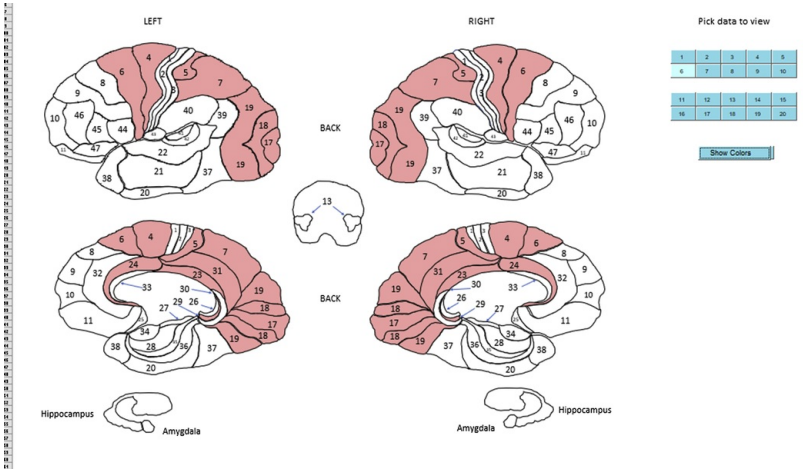

Fig. 27.4 Last analysis after Nearfield 8 sessions in 6 days. Alcohol free.

Fig. 27.5

I digested it and everything I could find to train a person on a thermal instrument. The next week after a successful treatment session he handed me another box, bigger, and informed me I was to train him on that the next week. This scenario was enacted 2 more times, so that by the end of 4 weeks I had thermal, GSR, EMG, and EDR under my belt. He then informed me that I would from then on, each Thursday evening, train up to 25 people on Biofeedback and Depression. “Oh yes, be sure to use the book Feeling Good by Dr. Burns”, he intoned.

Training 25 people every Thursday for 5 years teaches one a lot about biofeedback and how it works. These trainings caused me to grab biofeedback by the neck and use it with up to 90% of my clients.

What troubled me was that we were working with the muscles, the heart, blood flow and parasympathic system, not the brain. To me, the brain being the director of everything was where we needed to work. Happily, I learned of Adam Crane in Ossining NY who had biofeedback instruments that measured the brain waves and trained them. His 5 channel was too expensive so I bought the single channel with 2 references.

At that time, we, who were attaching sensors/electrodes to the scalp, were sure we could tell what was happening in the brain from that one electrode. The training regarding the brain anatomy, function and dysfunctional issues was provided by Marty Wuttke who to this day is a mentor and friend.

Alpha/Theta training was high on the list of protocols that could help most issues. One of my clients was a big muscled and tall musician. He informed me that he had stopped heroin, cocaine and hard alcohol, but I was not to do anything to his beer. I used the Peniston Alpha/Theta protocol with the behavior and cognitive techniques and 2 months later he came into my office and demanded to know what I had done to his beer. It no longer tasted good and he seem to have flu like symptoms when he did try to have a beer.

Still not satisfied with the single channel training, I kept looking and researching. At an AAPB conference in 1994 I happened on the Lexicor booth where there were tiny oval pictures on the monitor and I at once said that is what I need. Peppering them with questions, it became evident that this company had figured out a way to see the brain waves, distill them into a readable text and pictures with hard scientific evidence as to the information. They used a normative database to examine the raw waves. From that, one could, using a cap, train a person according to his/her brain needs. I purchased the Lexicor, a big box, and a big desktop and proceeded to cap clients and send the raw data to Lexicor for an analysis. They would send back the analysis, then I would phone them and go through the study until I understood what was what. This procedure was employed for 5 years until I attended a workshop on SKIL. SKIL is a normative database for analysis and training. Dr. Barry Sterman was the owner/presenter and at the end of the seminar I approached him on how I could buy the software and be trained on how to use it. He said give me a check for $2500.00 and you have the software and I can work with you via phone every Thursday for 3 hour for as long as it takes.

To say I was in ~~a bit~~ in awe is putting it mildly. Here was the man who had discovered the plasticity of the brain for training. His research on cats and epilepsy had led to the discovery that training 12–15 Hz at the sensorimotor strip tended to eradicate seizures. He called the training SMR for sensorimotor response. By the way, he does get a bit testy when he hears people use the term SMR and they are not training at the sensorimotor strip. As he is fond of saying at any other place on the scalp one is training 12–15 Hz. For 2 years from 6 30 p.m. to 9 30 p.m., every Thursday he and I would tear apart raw EEGs obtained during eyes closed, eyes opened, reading and math until we had pinpointed the areas that needed training, the type of training needed, and the protocol most likely to achieve success.

I truly believe Dr. Sterman should receive a Nobel Peace Prize for his work. His work has enabled thousands to have a normal life all over the world.

The training with Dr. Sterman was invaluable for enabling me to look at raw EEG and have an idea of what was not kosher. Then the normative database analysis would refine that impression until the issue would be in front of me, and the training that was needed was clear.

At the same time of the training with Dr. Sterman, I was attending workshops by Dr. Robert Thatcher who was refining his normative database, Neuroguide. I would travel all over the USA to attend his workshops because his depth of knowledge of the brain, its workings and how to find the location of dysregulation was exactly what I needed to deepen my knowledge and skills. One of his lectures showed how important was phase, i.e., timing of information flow. Yet, he would always say, but we don't have any way to train that now. Having been an actor, phase/timing resonated with me. You can have a fine interpretation of a character, but if the delivery of the lines are off, the whole performance is trashed. This is pretty much what could be said of the issue of phase in the brain. I kept looking from then on for ways to correct the timing, and it took years before such training was available due to technological advances.

Meanwhile Dr. Sterman and the J&J instrument company developed an acquisition and neurofeedback instrument that was and is one of the best available. Unfortunately, J&J only created 50 of those instruments and has not upgraded it to work on Windows 10. I still have it and hope someday to be able to use it again.

Developments in the middle years

Obviously, I continued to search for more and better ways of training the brain. Stimulation of various parts of the body was being tossed about, and there were hints that one could do similar treatment of the brain. Electric stimulation goes back to the ancients who used electric eels to heal clients. Not being a person who likes slippery animals nor did I think would clients, I looked at the instruments that were available.

Thus, LENS developed by Dr. Len Ochs came into my circle of knowledge. Again, the procedure made sense. The stimulation was at a very weak level so did not ~~cause~~ worry that it could harm one. Training was provided by Dr. Ochs who turned out to be a very skilled paradoxical clinician. Figuring out from the LENS map what to treat and what to expect proved to be a challenge. One of the most successful clients was a 7 year old child with attention and some behavioral issues. The mother said at the start of the treatment, if I don't receive a phone call everyday from the school I will know this was successful. We started in August and finished by the first of November. The mother did not receive one phone call from the school.

I continue to use LENS with clients and find that there can be marked changes rapidly. And, I find that when combined with z score Loreta training the changes can be even more rapid (depending on the type

dysregulation).

When the SKIL instrument was no longer working to my advantage due to changes in the feedback software, I purchased Thought Technologies neurofeedback and biofeedback instruments. Here were the up to date thermal (one small probe), EMG, and HRV in one instrument, plus neurofeedback. One of the most successful clients was a 2 year old child who had 40 seizure an hour (medically verified), had poor muscle tone and was nonverbal. I followed the same course of first conducting a QEEG and then developed the feedback protocol. I suggested the family purchase the Thought Technology instrument and train him at home 15 min a day. The reward was the opening of a colorful fan. When the brain would provide the correct response, the fan would open in beautiful colors. When the brain did not provide the correct response, the fan would close. After 11 months of home training with weekly training in the office, the child was down to one or 2 seizures a month. Two years ago, when I called the mother to see how he was, he was seizure free and had been for several years and was in school. Thought Technology is still in my roster of instruments, and I use it when appropriate.Figure 27.2

Somewhere in these years I moved to Brain expert and the Avatar neurofeedback. Again, here was a way of looking at the brain and seeing what was changing during the training. Very exciting and the use was successful. Again, the software was challenging, and so I attended workshops, and hired Penny Jean Gracefire to train myself and like minded clinicians on site. Creating protocols in the software was more of a challenge than I could master easily. The crew at Brainmaster, Tom Collura and Terri, were and are most supportive, and I still use Brainmaster for various clients.

However, my thirst to know what else was possible led me to keep attending LENS workshops and ISNR conferences. In 2004 Joe Horvat, PhD then the ISNR president asked if I would be the editor of the newsletter. Having no experience in such a venture I quickly agreed. When I reviewed the previous newsletters the paucity of information relevant to clinicians and researchers was evident. I determined to make the newsletter vibrant and useful for clinicians and researchers. Seeking out clinician/researchers whose work was being explored by many different environments yielded each of the 4 publications a year and at least 7 articles. These articles had to describe the scientific underpinnings, and the actual protocols used so that another clinician could put down the article and immediately implement it with his clients. And, the illustrations had to be in color. Black and white illustration of QEEG is very poor in communicating the nuances of the information. For 10 years myself and co-editor Roger Riss from AAPB provided a means by which new information could be communicated to clinicians in a useful manner. Some clinicians used it as a free handout to clients since the format proved to being easily comprehended by lay people as well as clinicians and researchers. Under my stewardship the newsletter was renamed NeuroConnections, and it can still be downloaded from the ISNR publication area. Publication was stopped in 2015, and a last one was issued in 2016 under editorship of Rob Coben PhD.

At a workshop in 2008 at Dr. Stephen Larsons facility in Upstate NY, a young clinician named Dr. Nick Dogris presented, and maintained we were not stimulating the brain at high enough hertz. To me he was opening a door to perhaps enabling phase training. I walked up to him and said, “If your ever build the instrument you are describing, I will buy it”. Six months later he called and said he had built it. I sent the check immediately. Three months later at ISNR he delivered the instrument and showed me how to use it. We took the instrument to my room with three other women clinicians who wanted to know what it was. He did a short PEMF for inflammation reduction on me and I was surprised at how relaxed it made me. Two of the women immediately asked to have a similar treatment. My friend, I noticed, who had been sitting in the bathroom watching had gravitated to the door and was on the floor against the door. Both Nick and I asked if she was OK and she replied, “that really gives out a strong wave”. This was my introduction to the levels of stimulation one must use with very sensitive clients when using pEMF. Sometimes the level is so tiny it would seem no stimulation is being given. Not true. I always start everyone out at a level that is very soft and comfortable and move up as the brain becomes more functional. Remember, I had had the training using LENS and thought I had the sensitivity issue well in hand. But, pEMF was another learning curve that had to be conquered.

Also, I learned that pEMF coils could be used on the scalp or body, and significant healing and relaxation takes place very quickly. I was training a young woman to be a neurofeedback therapist and she asked me to use the pEMF on her husband's ankle which, with over a year of physical treatment was still painful. I did one 30 min stimulation on his ankle and he stood up, walked around and looked at me a bit puzzled and said there is no pain. He then sent his physical therapist to me to receive a single session. She was also having difficulty putting any pressure on her feet. Again after 30 min of inflammation reduction on her feet, she got up and exclaimed “I can put pressure on my feet and it feels good.”

Meanwhile, Dr. Thatcher had perfected the Neuroguide normative database, and added the ability to use Neuroguide for training power, coherence, phase, phase lock and phase shift. Timing was now on the table to be addressed. LORETA training later became a mechanism that was being employed. Clients were being trained and changes were taking place at a much more rapid pace. Sometimes within a few sessions definite changes were being reported.

Below are two figures illustrating the changes in an alcoholic who received eight neurofeedback sessions in 6 days. He was alcohol clear by the sixth session, and, as can be seen, substantial change had taken place in his brain electrical activity. As I write this 6 months later he is still alcohol-free and working at top performance in an international position.Figures 27.3 and 27.4

Of course, Dr. Dogris did not stop with using pEMF and neurofeedback. He also perfected an instrument involving heart rate variability (HRV), transcranial direct current stimulation(tDCs), transcranial alternating current stimulation (tACs), transcranial random magnetic stimulation (tRMs), and surface neurofeedback All can be used together to address many issues. Still, one starts with the acquisition of raw EEG, analyzes it with a normative database and then constructs the training based on the findings.Figure 27.5

Before continuing it is important to look at what the various stimulation procedures are believed to be affecting. tDCs, which involves direct current, no frequencies involved, acts on blood flow, calcium ion activation and large network changes.

tACs refers to alternating current stimulation using defined frequencies the brain needs. It acts on functional issues, and involves entrainment. If the brain is stimulated at frequencies and levels deemed to be most beneficial, one can see immediately during z score training whether the brain can imitate (entrain to), and continue the use of the needed frequencies.

tRNS involves randomized frequencies which relates to resonance. tRNS is believed to fuel the brain and might help regenerate a system.

Recent developments and some comments on the field

Presently,and for the last three years, five clinicians and myself meet weekly with Dr. Joel Lubar to discuss cases and explore new ways to search out the issues the client is facing. We work out protocols and follow up with the results. Dr. Lubar and his wife Judith have been pre-eminent in the field. Having in 1973 discovered Dr. Sterman's work with SMR. Dr. Lubar and Judith translated that neurofeedback work to work with children with hyperactivity and attention issues. Following publication of an article some years later discussing their work in a woman's magazine they received 6000 letters requesting work with ADHD children.

Somewhere in my progress across the years I learned of pirHEG (hemoencephalography) at various conferences. This involves feedback of information concerning cerebral blood flow. At one conference, I attended a pirHEG workshop and volunteered to be the client. The movie serving as feedback was Fargo and everyone in the workshop wanted to see it, so I had to be very focused and keep it going. Fifteen minutes was the length of the demonstration and I thought nothing of it. Had dinner with friends and went to my room. Well, at 2 30 a.m. I was still energized and doing a lot when it dawned on me I was getting up at 6 a.m. I went to bed and slept the 3 hour. Then, I went looking for Dr. Jeffrey Carmen, the inventor of HEG program and instrument and asked if the HEG was the reason I had so much energy and could do so many tasks so easily. He said he forgot to tell me that when it is late in the afternoon and one trains with HEG they may very well stay up much later than usual with full energy and functionality. I must say even to this day when I train with HEG, my focus and productivity is highly increased and invariably I will ask myself what did I do. Then I remember I had conducted HEG training on myself and of course I was functioning at a high level. Some of my college clients have purchased the pirHEG to use at college. Much better idea than popping uppers. This instrument is excellent for headaches and for focus. It also seems to affect positively the EEG coherence (connectivity) issues. It uses 2 infrared lens to read the blood flow across the forehead. I often start clients off with this to enable them to understand neurofeedback. When they can keep the video going for long periods even at demanding thresholds they have internalized the basic techniques of neurofeedback.

At another conference Barbara Peavey recommended that my friend Gail Durgin and I try out the BAUD, an instrument which presents binaural beats at different frequencies. We even set up a time three months later for her to go over it and train us. When the three months rolled around neither of us could remember what the instrument was and what the training was to be, so we canceled. A year or so later, again at a conference, I sat down with the inventor and had him explain it to me. I have used it consistently since, especially with trauma patients. One of my clients was a man in his late 40's who came in raging that he wanted to kill the MD and his father wasn't any good. I pulled out the BAUD, and explained how to use it, and how the binaural beats can overwhelm emotional issues, and, like EMDR, reduce their valence to almost 0. The next session he came in and immediately informed me the MD was trying to do the best, and one need not be upset at that. So, the second session was focused on his father. Next session, there was similar change in belief. He continued for 4 more sessions, and said he was so much happier and wished he could continue, but financially he needed to stop.

Often, I will also teach the client to use EFT (Emotion Freedom Technique) taught to me by Gary Craig. With this technique I have witnessed results similar to those with EMDR and the Baud. I used It with a police office here in NYC who was terrified of driving over bridges. Since NYC has 793 bridges and tunnels, this was a difficulty for her. EFT was the technique and the treatment was delivered to her as she drove around and over bridges in NYC. In the 3 months of training there was only 1 time when she panicked and had to stop. She used the EFT on herself and we moved on within 15 min.

Recently I have been introduced to the Vielight. As the name implies the instrument delivers an infa-red light inside the nasal column. This treatment has been found to help with sleep and relaxation. Another instrument from the same company delivers gamma frequencies and has been reported to help with memory, and possibly reduce Alzheimer's symptoms.

For good old breathing training there are a lot of instruments, many that can be put on cellphones. I use the Muse and/or Heartmath. Both have easy instructions and clients like the ease with which they learn to relax. Again, our work in neurofeedback is ultimately to have the client relaxed and the brain to be efficiently functioning. Thus, our focus is to bring those conditions to the front. I will use whatever instruments

and protocols that will benefit the client. And, let me not forget to note that, as a psychologist, psychotherapy is intricately involved in my work with clients.

Recently my friend Elizabeth Harris MD from New Zealand introduced me to Quantum Reflex Integration (QRI) which follows a developmental process of reflexes in the body and brain that need to be integrated if such has not yet happened. This process is using stimulation throughout the body and brain to bring the relaxed and efficient state needed to function optimally. My own grandson who has had auditory processing and language issues, has benefited substantially from it. Moving from a restricted school special ed. environment to a new school that is more mainstreamed has made him very happy.

Often clients ask what will make neurofeedback training slower in working. My answers are: 1.Poor neural connectivity; 2. Low volume blood flow; 3. Poor nutrition and lack of exercise; and 4. Poor sleep. Often sleep, nutrition and exercise are the foci of my initial training. When sleep issues are diminished many other dysregulations also disappear.

Clients also often ask why we need a QEEG. I liken it to them going to see an MD and their telling him they have a pain in the right side. I ask would they then follow the MD to the operating room without any blood testing and perhaps an X ray to determine the actual issue. All say, of course they would demand testing and x ray before the surgery. Well, I believe it is the same here. If we don't examine the entity that we are treating, how do we know what to do? Dr. Daniel Amen put it this way, (I am paraphrasing), “in all the rotations we examined the organs and operations deeply, but when the rotation was psychiatry we never looked at the brain and I found that odd”.

So, in my journey, I have used, tested, continued to use, and sometimes put away many instruments and techniques. Do I believe it works? Yes, neurofeedback, QEEG and the many techniques I use are FDA registered, have some scientific underpinning and are effective. In my more than 30 years as a clinician I have treated more than 2000 clients of all ages, and have testified at five traumatic brain injury cases (in which each case was found in favor of the client).

Why is neurofeedback not yet mainstreamed? I have often said, if it were, there are not enough clinicians to meet the demand. Presently there are perhaps 10,000 neurotherapists in the world. According to~~the~~ Dr. Thatcher, there are at least 1000 who use LORETA training. And, there are about 100 who use Dr. Dogris’ excellent combination of stimulation and training. Thus, the number of trained and certified clinicians are small relative to the need.

Another reason for the technique not being mainstreamed is the paucity of truly accurate, and meaningful research. Most of the research either did not actually study neurofeedback as clinically used, or the findings were so weak that a conclusion was made that neurofeedback does not work. If the researchers were to start with a deep understanding of learning theories, they would know the ability to test the techniques with traditional rigorous randomized, blinded, placebo -controlled designs is almost impossible. Why? Because any subject being given a stimulus and reward figures out the parameters very quickly, thus making it very difficult or impossible to tease out what has been effects specifically of the neurofeedback training. Rather, let's look at the tens of thousands of clients who have benefited, and figure there is a significant advantage to this technique. As we have learned from recent studies of medicine ~~that~~ “80% of non-randomized studies (by far the most common type) turn out to be wrong, as do 25% of supposedly gold-standard randomized trials, and as much as 10% of the platinum-standard large randomized trials. This found in Ioannidis study in *PloS Medicine.*

Also, the “one size fits all type of technique” used by many practitioners does, I believe, a disservice to the clients and to the field. Recently I read a statement of the inventor of one of those techniques stating that clinicians did not need to know anything about the brain. Another negative issue concerns equipment that does not meet the criteria for being scientifically validated and reliable. These are flooding the market place with cheap instruments, guaranteeing relief from all types of symptoms. I always get very suspicious when a website will not give the specifications of the instrument, or the frequencies being “trained” or the level of intensity. I have had many clients bring me information asking if this or that advertised instrument would work. If I don't know the instrument, and have not tried it out on myself (a practice I continue with all instruments that I work with), I cannot recommend it.

One continually hears the statement that neurofeedback is experimental .... (only 50 years old !) Insurance companies use that description to deny payment. The medical field has only begun to investigate the treatment. I must say, however, that the medical professionals who refer clients to me are very supportive and knowledgeable. My hope is that their view soon will permeate the medical profession and insurance companies so that more clients can benefit from this noninvasive, ~~and~~ ~~usually~~ safe and highly effective treatment.

Queries and Answers

Query: Please provide an abstract and keyword if required for this Chapter.
Answer: None required

Query: Please provide complete affiliation details for the author “Merlyn Hurd” in the following form: Department/division names, Institution/organization, city, state/province/territory(for United

States/Canada two-letter postal service format, Australia three-letter format), and country (written out in full).

Answer: Merlyn Hurd PhD, New York , NY USA 10010

Query: Figure 27.2 to 27.5 were not cited in the text. Please check that the citations suggested are in the appropriate place, and correct if necessary.

Answer: Have assigned where they should be placed

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Answer: NeuroField instruments of acquisition and stimulation

Query: Figure 27.2 looks pixelated. Please provide better quality figure.

Answer: Do not have better image

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