

The Realities of Remote Neurofeedback

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In this discussion we will address some of the clinical, technical, and medicolegal aspects of remote training. Fundamentally, remote training consists of sending EEG neurofeedback equipment into the home, school, or office, where it is used in the absence of direct supervision of the responsible clinician. We are seeking a new model, in which the EEG instrument becomes more like an electronic dispenser, that administers treatments according to specific protocols and parameters set by a supervising clinician, and administered in a remote location (home, school, office). We seek provisions that ensure that the clinician has access to ongoing information regarding the progress of training, and maintains a level of control sufficient to ensure the quality and effectiveness training, without the need to be physically present during all training sessions.

There are certain barriers to effective remote neurofeedback that must be cleared, if progress is to be made. It is an unavoidable fact that neurofeedback is a procedure that requires clinical supervision, and that the requisite equipment is regarded as a prescription device. Moreover, the clinician is responsible for the conduct and results of neurofeedback training, even if sessions are not conducted in the office. Finally, it is clear that remote neurofeedback will not gain the acceptance it needs, unless there is a way to ensure that quality is assured, even when equipment leaves the office.

Remote neurofeedback training should not consist of simply sending a clinical instrument home with a trainee, while expecting a parent, companion, or the trainee themselves to become a neurofeedback therapist. Rather, the remote-based system should have a level of simplicity and control that makes it easy to use, while ensuring compliance. The clinician requires ongoing indications of the progress of treatment, the time, duration, and outcome of individual sessions, EEG changes, behavioral notes, and so on. The key necessity is that clients can easily perform the training that has been defined, and that the clinician can be made quickly aware of how things are progressing, and has the ability to make changes as necessary.

We believe that in order for neurofeedback to reach the next level of acceptance and deployment, costs must be decreased, and time in the clinic must be reduced. We see the conventional series of 40 in-office visits at \$50 to \$100 apiece, being replaced by a small number of in-office training sessions, which punctuate the remote training. We seek a new way of looking at equipment, software, and clinical activities, which will help to transform neurofeedback from a primarily clinic-based activity into one that can be conducted any time, any where, while maintaining a level of clinical supervision and confidence that sufficiently approximates what can be achieved in the clinic.

## Remote Neurofeedback

If we can achieve these goals, the following realities may come to pass:

- A reduction in the cost of a typical neurofeedback regimen from the current level of \$2000-\$4000, to \$500-\$1000. This will have a profound effect on the attitudes of insurance providers, schools, parents, and other entities that bear the financial burden of the training.
- An increase in the number of clients that a given practitioner can serve, from 20-40, to 100 or more.
- A shift in the professional and financial picture of clinical neurotherapy, in which charges for professional services, equipment rental, remote supervision, and ongoing assessment supplement or replace the usual office visits, making the clinical task less labor-intensive, and more cognitive in nature.
- A broadening of the client base of all clinicians, who now can overcome geographical and financial barriers, as they serve a wider range of clients than ever before.
- An increased awareness and acceptance of neurofeedback, as more clients are able to afford training, and reap the benefits.

Many practitioners believe that effective remote training requires some form of real-time connectivity, so that the training session(s) can be monitored live, to ensure that all is necessary is to ensure that the training is proceeding as planned, but this can be managed by a system that allows the supervising clinician to see results, review self-assessments and related reports, and discuss progress over the telephone. Indeed, one of the more active clinicians we know has more than 30 EEG systems in the field, in various states, some thousands of miles from the office. All clients must begin with an in-office orientation and training, and then proceed to a home-based training program, in which geographical distance is not so much of an issue.

While this practice has been successful so far, it clearly taxes the abilities of clinicians and trainees, as well. Home users are obligated to learn to use equipment according to the same procedures as a clinician, including setting up the protocols, managing thresholds, monitoring progress, reviewing summary information, and determining whether the progress is satisfactory. We seek to relieve much of this burden on both sides, while ensuring the quality and effectiveness of remote training.

Overall, we see the use of home/school/office EEG increasing 10-fold or more, as a result of simple, yet crucial changes in how we approach the total set of issues.

To these ends, we see the following components as being critical to the effectiveness of remote training:

## Remote Neurofeedback

- Provisions for clinicians to design protocols and sessions on one system, that can be conducted on another system.
- Means to convey protocol and session settings to the remote system via inexpensive and simple means (email, floppy disk, internet, etc). This should include a method for remote trainees to incorporate this information into their system in a simple, fail-safe manner.
- Means to ensure that remote trainees are limited to the prescribed activities, and cannot go outside the boundaries that have been defined. This should also include a means to ensure that trainees have actually conducted the prescribed training, for the recommended times and durations, and that the resulting EEG data reflect appropriate changes.
- Means to convey results to the clinician, again via inexpensive and simple means (email, floppy disk internet, etc). Results should include general session data (time, duration, etc), training results (points scored, percent rewards, etc), specific EEG results (amplitudes, etc), and associated self-report and behavioral data.
- Means for the clinician to review training results, make changes when indicated, and convey these changes back to the remote location.

Based on a focus on these simple requirements, it is possible to configure systems that effectively address remote training needs, without increasing their complexity or cost. Indeed, it is possible to produce home-based systems that are considerably affordable, with an initial capital cost of \$1000 or less, and that can be leased, loaned, or otherwise allotted to remote trainees who do not have to bear the purchase cost of equipment. Overall, we see it possible for remote trainees to subscribe to “pay as you go” plans, in which EEG training is made available for on the order of \$100 or \$300 a month, thus reaching a considerably enlarged client base, while providing effective, quality training.

## Practical Alternatives for Remote Neurotherapy:

How Do We Reach the Home, School, and Office?

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## Our Intent - 1

- To facilitate an order of magnitude (or more) increase in the global availability of neurofeedback
- Reduce client costs by an order of magnitude or more
- Create a natural extension of clinical practice
- Overcome geographical, time barriers
- Provide simplicity, confidence, effectiveness for remote training

## Conventional Wisdom

- “There is no reason for anyone to have a computer in their home”
  - James Olson, CEO, digital equipment corporation (DEC) – 1978
- “Home neurofeedback training will never be practical”
  - Anonymous clinician - 2002

## Our Intent - 2

- Open the doors to homes, schools, businesses.
- Empower clinicians, extend & expand their practices.
- Enlist the support of HMO’s, insurance providers.
- Get to or below the cost of other alternatives.
- Work within the intent of the FDA, etc.
- Increase overall awareness, acceptance of neurofeedback.

### Facts - 1

- Neurofeedback machines are prescription devices by federal law.
- Devices may be deployed only by or on the order of a clinical practitioner.
- The supervising clinician is responsible for activities & outcomes.
- “Roll your own” remote neurofeedback is not an answer.

### An Opportunity to Rethink Things

- Old model – clinic based
- New model – clinic and remote based
- New way of approaching clinical practice
- New model for clinical, financial issues
- New opportunities for clinicians and clients
- A clinician can reach >40 clients/week and maintain quality, professionalism

### Facts - 2

- There is no fundamental reason we cannot get neurofeedback into homes, schools, offices.
- Telemedicine is the future of medicine.
- Teleneurofeedback is the future of neurofeedback.

### Issues - Clinicians

- “I would never send a neurofeedback system home.”
- “I have no idea how I would control it.”
- “How would I protect myself and my clients?”
- “I don’t have the time for all the extra training, monitoring, reviewing, etc.
- “How would I get paid for all this?”

### Issues - Clinicians

- “I sent a system home, and now I don’t know what they are doing with it”
- I’m not sure they are doing what I recommended
- I think they are now (or also) working with clinician (or non-clinician!) Jones
- How do I know they are not sharing protocols with others? Am I responsible?

### Issues - Clients

- “I checked with someone else, and they told me to ...”
- I heard that this was a good protocol...
- I read ... on the internet so I thought I’d try it out on my son
- Now I want to sell my equipment

### Issues - Clients

- “I thought my clinician told me to...”
- “Now which one is the blue one?”
- “I don’t know what I’m looking at”
- “It was so complicated, I don’t remember all the details”
- “I think I’ll just try something different”
- “I don’t think I need to go back to Dr. Smith”

### Old Model

- Send a clinical instrument home
- Train users to become mini-clinicians
- Surrender control
- Sacrifice confidence, peace of mind
- Lose ability to track progress
- How to follow up, manage changes or completion of training?

### Think of It As a Dispenser

- A low-cost vehicle for delivering sessions
- Rental/service vs. Purchase/training
- Simple, safe, efficacious
- Versatile, flexible – like a bottle of pills
- Client can do what they need, with confidence
- Need “use as needed” option for HW/SW

### It's About Empowerment

- Empower clinicians to enable remote training
- Empower clients to have safe, effective training at their location & within their schedule
- Give everyone what they need when they need it
- Not forcing anyone – clinician has options, makes decisions

### Clinical Practice

- Must be simple, easy to:
  - Preprogram sessions
  - Send sessions to remote location
  - Keep track of progress
  - Ensure compliance, reporting
  - Make changes as necessary
  - Increase client base by an order of magnitude

### Basics

- Simple control & communication methods.
- Integrated with software & procedures.
- Do not depend on “live” internet.
- Can use pc-anywhere, GoToMyPC, etc. If desired – generic PC solution.
- Accommodate a range of methods.
  - Email, floppy disks, ftp, sst, etc.
  - Provide variety of simple tools, procedures.

### Details - 1

- Think of a digital clinical folder
- Foundation for remote methods
- Contains settings, protocols, doses
- Contains results, summaries, reports
- Provide simple tools for packaging, transfer, use of folders both at clinic and at remote location
- Easy to send back & forth

### Summary

- It's not that difficult.
- Software is the key.
- If we can send insulin home, we can send neurofeedback home.
- We can share a vision, accept common principles.
- It can be good for everyone involved.
- We can move together to the next level.

### Details - 2

- Provide methods to maintain clinical control.
- Provide ways to authorize, control sessions.
- By minutes, by date, whatever.
- Ensure client complies with type and amount of feedback.
- Ensure client reports back to clinician.
- Ensure clinician can easily modify, update parameters.



## **Neurofeedback Practicum - Remote Training. (2 HRS)**

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**Abstract:** This workshop will be a hands-on demonstration, and participants are invited to bring equipment for in-class work. The emphasis will be on working up and managing remote clients, using home, school, or office-based equipment. Methods will be shown to handle simple assessments, set up protocols and controls, administer them to clients, and maintain ongoing control and supervision.

Each participant will have the opportunity to understand how to manage remote clients for neurofeedback training, as well as how to set up and monitor training from a central location, with clients in diverse locations.

### **Recommended Readings:**

Gunkelman, J., Johnstone, J., et al. (2002). Incorporating qEEG into neurofeedback protocol development. Los Angeles, CA: Q-Metrx.  
Othmer, Sue. (2003). Neurofeedback - An introduction to clinical practice. Woodland Hills, CA: EEG Institute.  
Soutar, R. (2002). Doing neurofeedback. Atlanta, GA: Synapse.

### **Remote Training Practicum**

#### **Objective:**

Based on the content of this session, the participant will be able to understand how to manage remote clients for neurofeedback training, as well as how to set up and monitor training from a central location, with clients in diverse locations.

#### **Abstract:**

This workshop will be a hands-on demonstration, and participants are invited to bring equipment for in-class work. The emphasis will be on working up and managing remote clients, using home, school, or office-based equipment. Methods will be shown to handle simple assessments, set up protocols and controls, administer them to clients, and maintain ongoing control and supervision.

Prerequisites: None

Level of Difficulty: Intermediate

#### **Suggested Reading:**

Soutar, R. (2002) Doing Neurofeedback, Synapse, Atlanta, GA

Othmer, Sue (2003) Neurofeedback - An Introduction to Clinical Practice, EEG Institute, Woodland Hills, CA

Gunkelman, J., Johnstone, J., et. al (2002) Incorporating qEEG into Neurofeedback Protocol Development, Q-Metrx, Los Angeles, CA

BCIA Areas:

V (D) INSTRUMENTATION: Computers in Biofeedback

VII (A-D) TREATMENT PLANNING

IX (A) PROFESSIONAL CONDUCT: Ethical principles, standards

Questions:

1. An intake for a client that anticipates home-based remote training should always include which of the following:

- A. There is no minimum requirement
- B. A QEEG workup
- C. Face-to-face meeting with client's family/support
- D. Same as for an in-office workup
- E. C. and D.

2. When monitoring a session that uses autothresholding, which of the following parameters should be monitored:

- A. Signal Amplitudes
- B. Percent Time over Thresholds
- C. Threshold Values
- D. Points rewarded
- E. All of the above

3. How much "in-office" training should be expected, before a typical client can generally be able undertake home-based neurofeedback training:

- A. None
- B. 1 or more sessions
- C. 5 to 20 sessions
- D. 20 to 40 sessions
- E. 40 sessions or more

4. Which of the following protocol(s) can be effectively handled via. remote training:

- A. SMR/Theta
- B. Alpha/Theta
- C. "Squash"
- D. Coherence training
- E. all of the above

5. Remote training can be conducted safely and ethically in the home, school, or office if:

- A. The client and their support are under clinical supervision
- B. A family member is a neurotherapist
- C. A family member is a college graduate
- D. The equipment ensures quality and reportability of results
- E. A. and D.

Answers: 1. E 2. E 3. C 4. E 5. E

**Remote Training with  
BrainMaster**

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**Basics**

- Session Folders
- Session Librarian
- Passkeys
- Simple Procedures

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**Basics**

- Perform assessment
- Create plan
- Set up folders
- Convey to client
- Provide equipment to client
- Combine with passkeys to enable training

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### Session Folder

- Contains settings, # of sessions, duration of sessions, etc. etc.
- Contains results, summaries, statistics, etc.
- Passed back & forth between clinician and client

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### Session Librarian

- Use any time, any place
- "zip" up complete folder(s)
- Save on floppy disk or hard disk
- Email, ftp, SST, etc
- Folder is always complete

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### Passkeys

- Authorize the use of clinical sessions
- Provided to clinician by equipment provider
- Administered to client by clinician
- Ensure folders are not misused, copied, passed around, etc.

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### Passkeys

- Unique to device serial number
- Controlled by clinician
- Regulate session use by:
  - Time (minutes)
  - Date (any date in future)
  - Unlimited (in special cases)

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### Example

- Provide 40 20-minute sessions to client
- Provide 100 minutes of authorization
- Client trains 5 sessions, then system stops
- Client must report to clinician (email, phone, etc.)
- Clinician reviews results, makes changes as needed, authorizes another 100 minutes
- Etc. etc. etc.

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## BrainMaster 2.0 *with Session Librarian*

