

Hemo-Encephalography (HEG)

A practical approach to Neurofeedback Training



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Purpose and Introduction

Neurofeedback is a fast progressing treatment method. The scope of pathologies and non-pathologies being treated with neurofeedback is likewise growing steadily. One of the biggest challenges in neurofeedback particularly when treating children (i.e. with ADD/ADHD) is that EEG-based neurofeedback is easily impacted by artefacts; in addition, at a rate of one session per week typical neurofeedback therapies for ADD/ADHD take about a year to be completed.

This work describes a different approach to neurofeedback treatment. It is based on the concept of nIR-based HEG therapy as proposed by Toomin and others. The key target groups here are ADD/ADHD children, dyslexic children and children with other forms of learning disorders. The authors are in the process of assessing the potential of a time compact HEG training of several sessions per day over a duration of one or two weeks each. The aim is to provide children and youth with limited concentration and endurance with a treatment they can more easily cope with and perceive as successful in a fast and convincing way.

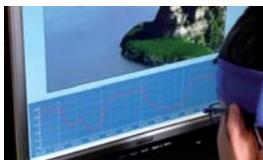
The treatment in this case is embedded in the clinical practice of a medical specialist for occupational health. The participants of the HEG training have undergone a sequence of other measures prior to HEG treatment which is briefly described in the following for better reference and understanding:

The "psychomotor holistic therapy" (PMH / PMG = Psychomotorische Ganzheitstherapie by Kannegießer-Leitner) is a form of dedicated therapy where diagnosis and development of the individual therapy plan take place in the clinical practice, while the actual training for the most part is done at home. The HEG treatment described in this work is the one key exception to this routine procedure. PMH integrates and combines several therapy methods depending on the individual client's needs. This includes PADOVAN concept, the Warnke®-method for Central Auditory Processing (CAP) and others. HEG (HemoEncephaloGraphy) has been added as a key therapy well over a year ago with astonishing success.

Materials and Methods

Patients:

- ⇒ with ADD/ADHD
- ⇒ with or without additional development disorders
- ⇒ particularly struggle with focussing
- ⇒ easily distracted by stimulus from their respective environment



Warnke® method to improve both auditory and visual brain processing skills
Padovan's concept of neurofunctional reorganization to facilitate inter-hemispheric coordination

... become integrated into the ...

PsychoMotor Holistic Therapy (PMH / PMG = Psychomotorische Ganzheitstherapie by Kannegießer-Leitner)

... results to an improvement of endurance, speed, concentration in day-to-day routines

+
HEG (HemoEncephaloGraphy): Neurofeedback using HEG brings the subject to increase blood flow to a targeted area of the brain

- ⇒ 30 – 40 sessions
- ⇒ With the goal to improve the blood flow in the prefrontal cortex ...
- ⇒ and to increase the supply of oxygen and glucose in this region
- ⇒ Hereby automating new processes in endurance, speed and concentration in the daily routine and new possibilities of the concentration in everyday life

=
New approach to HEG based neurofeedback

- ⇒ 3 times a day
- ⇒ 3 – 5 days day after day
- ⇒ 2 or 3 intensive weeks with intervening breaks

While the overall evaluation of this new form of compact HEG treatment is still an ongoing process, the following case studies show the potential of this new approach.

References

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Results

The original assumption for a compact daily training being at least as effective as the standard once-a-week approach appears to be correct. Based on a population of currently n=14 participants, the effectiveness of this treatment becomes obvious when looking at the development and level of improvement the participants show in pre-post comparison. The GAIN as an indicator for the ability to increase the level of alertness throughout the overall session is significantly increased in each of the participants. The overall change is from an average gain at 0.4 to a gain of 9.0 in the second training block. In addition, both clients and parents report noticeable changes in the daily routine and performance. The method is subject to further analysis and evaluation.

Fig. 1.:
Training curve during 1st training sequence

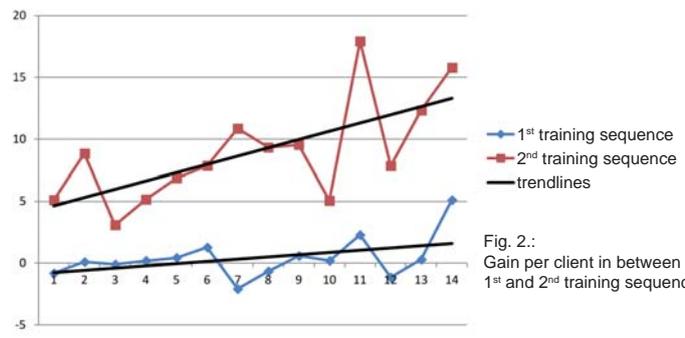


Fig. 2.:
Gain per client in between 1st and 2nd training sequence

Fig. 3.:
Training curve during 2nd training sequence



Conclusion

- HEG with 30 to 40 units: First improvements show after approximately 15 training sessions
- ⇒ In a weekly training setup, it takes almost four months to show first effects.
- ⇒ In the compact training approach, it takes on week of intensive training to do the same.
- ⇒ This has strong positive effects on the clients motivation and endurance.

In the once-a-week training setting, the client is often side-tracked by events in his daily routines: violin lessons, soccer training, etc. Focus and attention more often than not are not at their best.

In contrast, the intensive training model with several sessions per day throughout an entire week facilitates the effects of each training model and thereby allows the client to automate corresponding new processing routines and to facilitate the training effects in his daily life. Redoing this weekly training routine once or twice shows that during the intermission between the training blocks, the client strongly improves and accomplishes a significant increase in raising the level of blood flow and oxygen support indicated thereby. Compact HEG based neurofeedback training appears to be a very sound alternative to current state-of-the-art weekly training models.