Dr. Martin Scharf, PhD, FABSM

I first worked with Dr. Dan Cohen in 1985 when he pioneered the development of automated sleep disorders diagnostic systems for sleep labs. At that time there were 300 sleep labs in the US. Now there are 4700, based in part on his work. It would have been difficult to recruit and train the number of technicians necessary to analyze all those nighttime tracings without his equipment. His systems (lab-based and portable home units) allowed us to dramatically expand the field. In fact, I alone was able to quickly open 20 satellite labs, using his equipment with automated analysis.

Dan and I next worked together when he showed up with the Breathe Right nasal strip. The clinical studies immediately demonstrated that it worked to improve sleep and reduce or eliminate snoring.

When he called me up a year ago and said he and his team had invented this drug free, non-invasive technology to induce and maintain sleep, I was not skeptical due to his past work. However, when he said it would also restore and increase Delta sleep (very deep sleep that is responsible for growth hormone secretion and healing) that we lose as we age, I needed to see and experience that for myself.

I had arranged 4 people to do nap studies in the morning, after a full night's sleep, when it is difficult to induce sleep, let alone induce delta sleep. He put this magnetic generator at the foot of the bed, and we wired up the subjects and recorded them with standard polysomnography. He and I watched the polysomnographic tracing in real-time during the first 3 cases. We also could observe the subject directly via video camera.

I have been doing this work for 50 years and I saw some things I never expected. I also was the fourth subject, so I got to experience it for myself. All 4 subjects fell asleep. Three of them even reached Delta sleep, including myself at age 73. This was remarkable. It was also fascinating to watch the subjects on video. For an hour they were motionless. That is very unusual as people typically move a bit while asleep, as they arouse and shift and turn.

You may say, well, that was only 4 subjects. That is nothing more than proof-of-concept and requires much more study. I would tend to agree, but we saw something else that I have never seen before. All 4 subjects exhibited a very exaggerated level of slow rolling eye movements (SREMs) due to their technology. Normally, SREMs only appear in small bursts during Stage 1 sleep or drowsiness. The presence of SREMs indicate the initiation of sleep. All 4 subjects had long trains of SREMs in Stage 1. Some even had SREMs at the end of Wake and into Stage 2 sleep. This represents a biologic marker, consistent with the underlying mechanism of action that physiologically produces normal sleep.

This finding is profound, because it means that Dan and his team have discovered how to reliably reproduce the natural mechanism for sleep induction, thru the normal neurologic pathways. I have analyzed well in excess of 10,000 sleep studies and until these four subjects I have never seen this. As far as I am concerned, demonstrating this in 4 consecutive cases is proof that it will continue to work in the vast majority of people, because the technology is actually triggering the normal mechanisms of sleep, even Delta sleep. They have discovered how to trigger the pacemaker of sleep and how to influence its various stages (light sleep, delta or deep sleep and REM or dream sleep), using different magnetic frequencies.

Feel free to contact me directly with any questions.

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Evaluation of the Effectiveness of Extremely Low Frequency (ELF) Magnetic Stimulation on Sleep During a 60-Minute Nap Study

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We recently polysomnographically monitored four individuals, while they received fixed stimuli from the device placed at the foot of the subject's bed.

Objective: The purpose of the uncontrolled experiment was to determine whether autonomic (parasympathetic) and theta frequency stimulation would produce light sleep and whether delta stimulation would induce slow delta waves. The goal was to establish that magnetic entrainment of EEG using the device would be evident in the EEG with objective and subjective results suggesting biological effect.

No attempt was made to adjust, in real time, the delivered frequencies during the 60 minutes recordings. The settings were fixed allowing for autonomic and theta stimulation for 25 minutes followed by autonomic and delta stimulation for 30 minutes and then a "magnetic coffee stimulus" to energize the subjects in the final 5 minutes of recording.

All subjects slept with the 2 oldest experiencing what they described as deep sleep followed by a sense of relaxation and feeling refreshed. None of the subjects exhibited sleep inertia upon awakening. Sleep inertia occurs when awakened from a nap or deep sleep with sleepiness persisting for several minutes after awakening.

Observations:

1. All subjects showed long trains of normal-appearing slow rolling eye movements (SREM) in the EOG (electro-oculogram). SREMs normally are present only in the latter part of stage 1 light sleep with subjects often unaware and denying that they experienced any sleep if awakened at that time. The SREMs persisted during the presence of alpha/theta prominence in the EEG of stage one and continued in stage two and surprisingly, were even present during some epochs of wake. The only reports of non-REM eye movements in the literature are associated with the use of SSRIs, particularly Prozac or in patients in PTSD. The Observed SREMs in this study were unique in that they occurred in wake to some degree and stage 1 and 2 in long trains of calm slow waves not suggesting intense mentation. The consistency of these SREMs in each subject suggests some type of interference or override of each subject's EEG and may be a marker for biological EEG override.
2. Slower brain waves and slow wave (delta) sleep were induced in 3 of the subjects with 2 of them reaching the deepest stage of sleep. This is unusual since daytime naps in middle age to elderly patients are rarely accompanied by stage 3 sleep and especially not during daytime naps.
3. Another observation was the essential absence of movement in 3 of the subjects. Usually there are at least several body movements at the start of the recording as subjects identify their most comfortable sleep position. In this study, 3 subjects barely moved for an hour.

We have previously found when slow wave sleep increased there is a concomitant increase in growth hormones. As sleep deteriorates, slow wave sleep and growth hormone levels decrease dramatically. In addition delta sleep and growth hormones diminish markedly over person's lifetime. Increasing delta sleep is associated with increased release of growth hormone. Thus it's of major import to determine if this relationship is maintained when delta sleep is induced magnetically.

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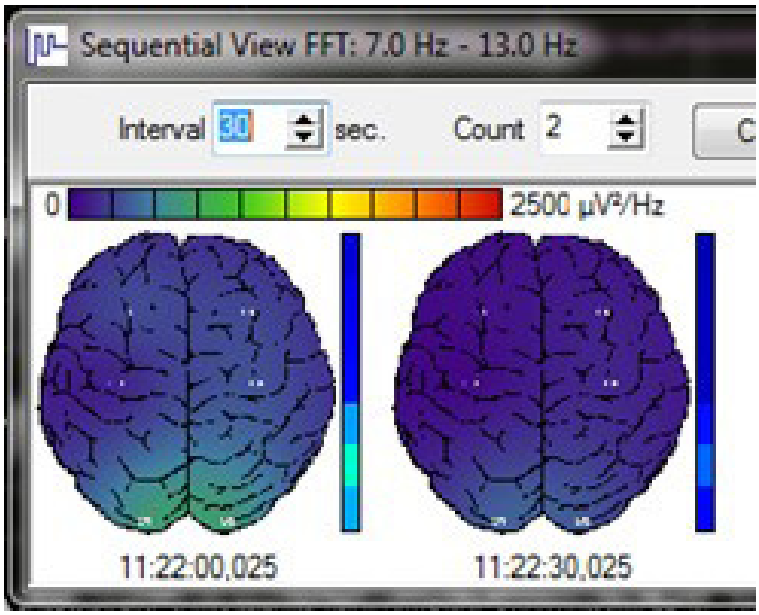
Conclusion:

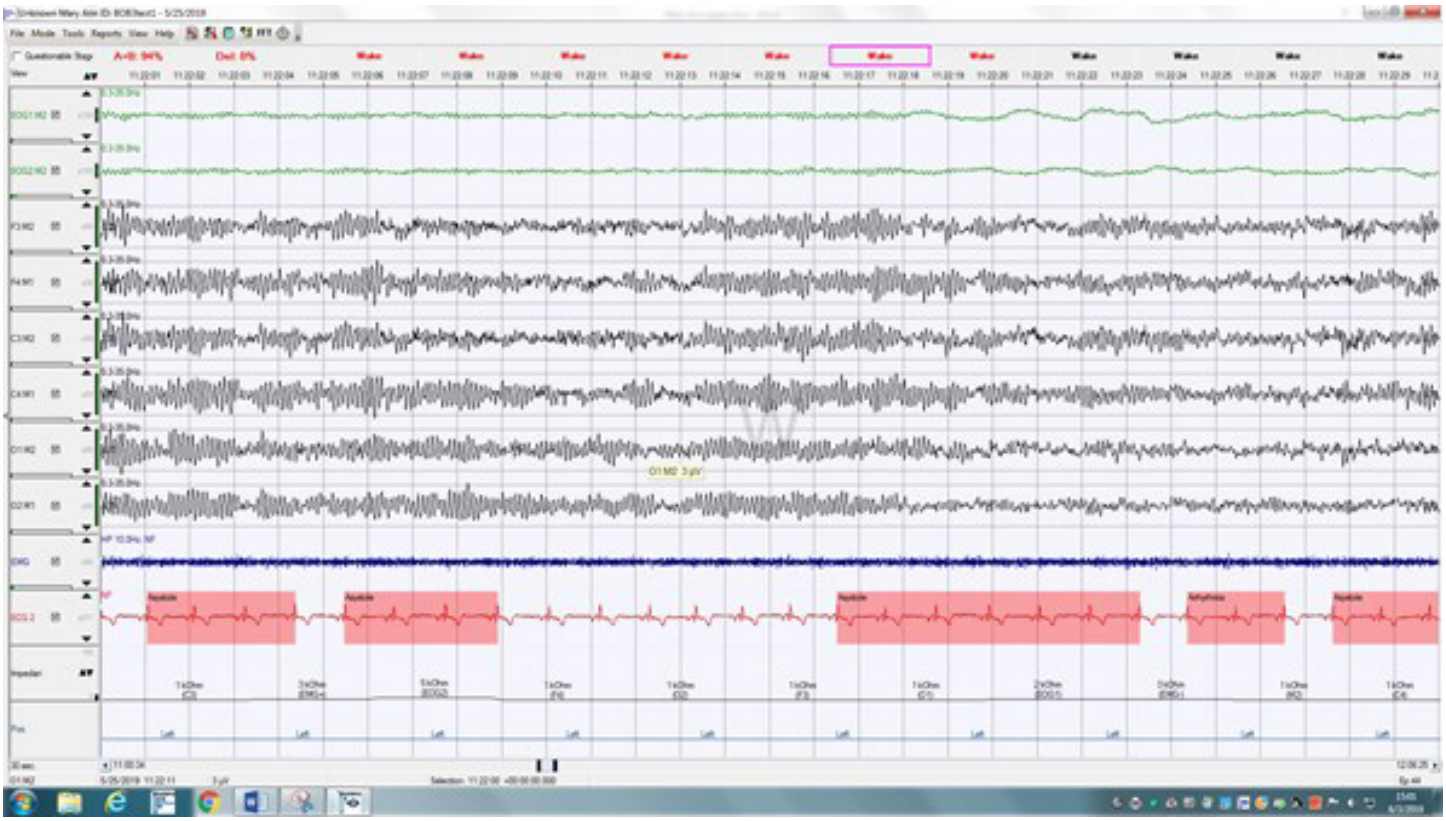
These observations are consistent with the speculation that the use of Eclipse is associated with restful and restorative sleep. Further, it seems, that a unique biological effect was evident in the recordings secondary to Eclipse stimulation.

Preliminary observation showed no significant effect on heart rate but a baseline comparison is necessary, however, it should be noted that no heart rate entrainment was used in the Eclipse settings.

Pictured are FFTs of stages wake, light sleep and delta sleep along with the associated EEGs from one of the representative cases.



Note greater (lighter activity) at the back of the brain demonstrating greater alpha activity (7 Hz – 13 Hz)



Epoch 44 – wake (9 minutes after lights off) – note significant alpha activity in EEG tracing

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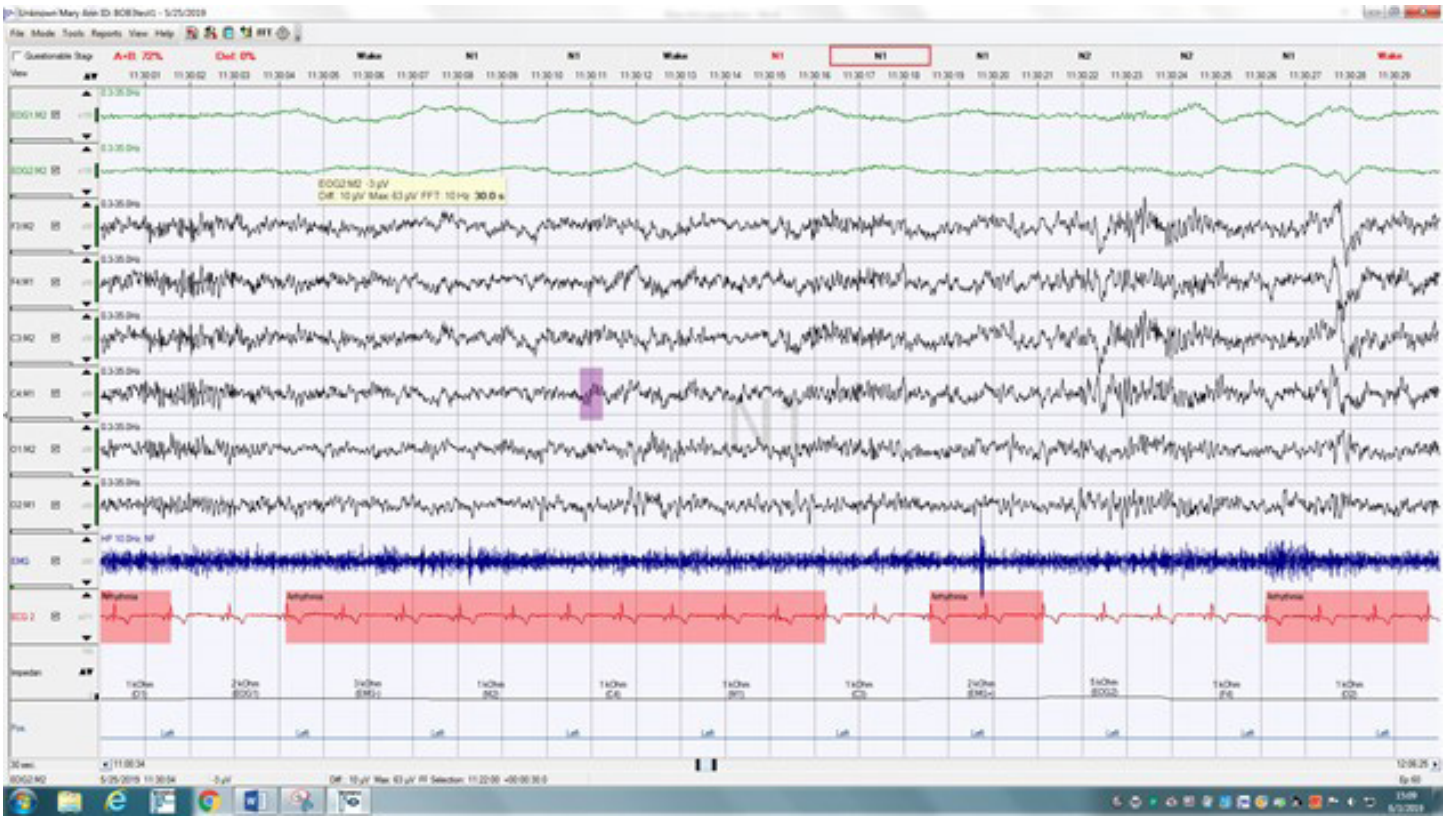
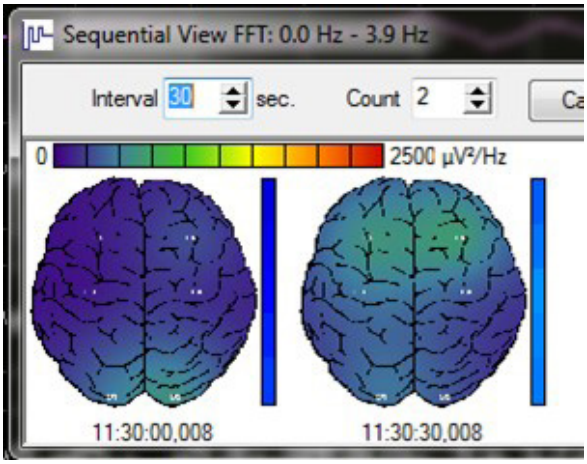
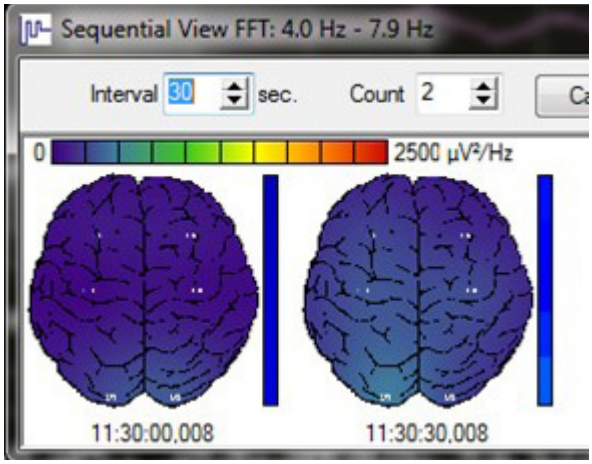


Epoch 60 – N1 (17 minutes after lights off) – note extensive SREMs (1st two lines) & less EEG alpha





Note higher slow wave (0 Hz – 3.9 Hz) activity at the front of the brain denoting the SREMs on rightmost brain pic on the left set. Note higher theta activity (4 Hz – 7.9 Hz) on the right pics associated with light sleep.

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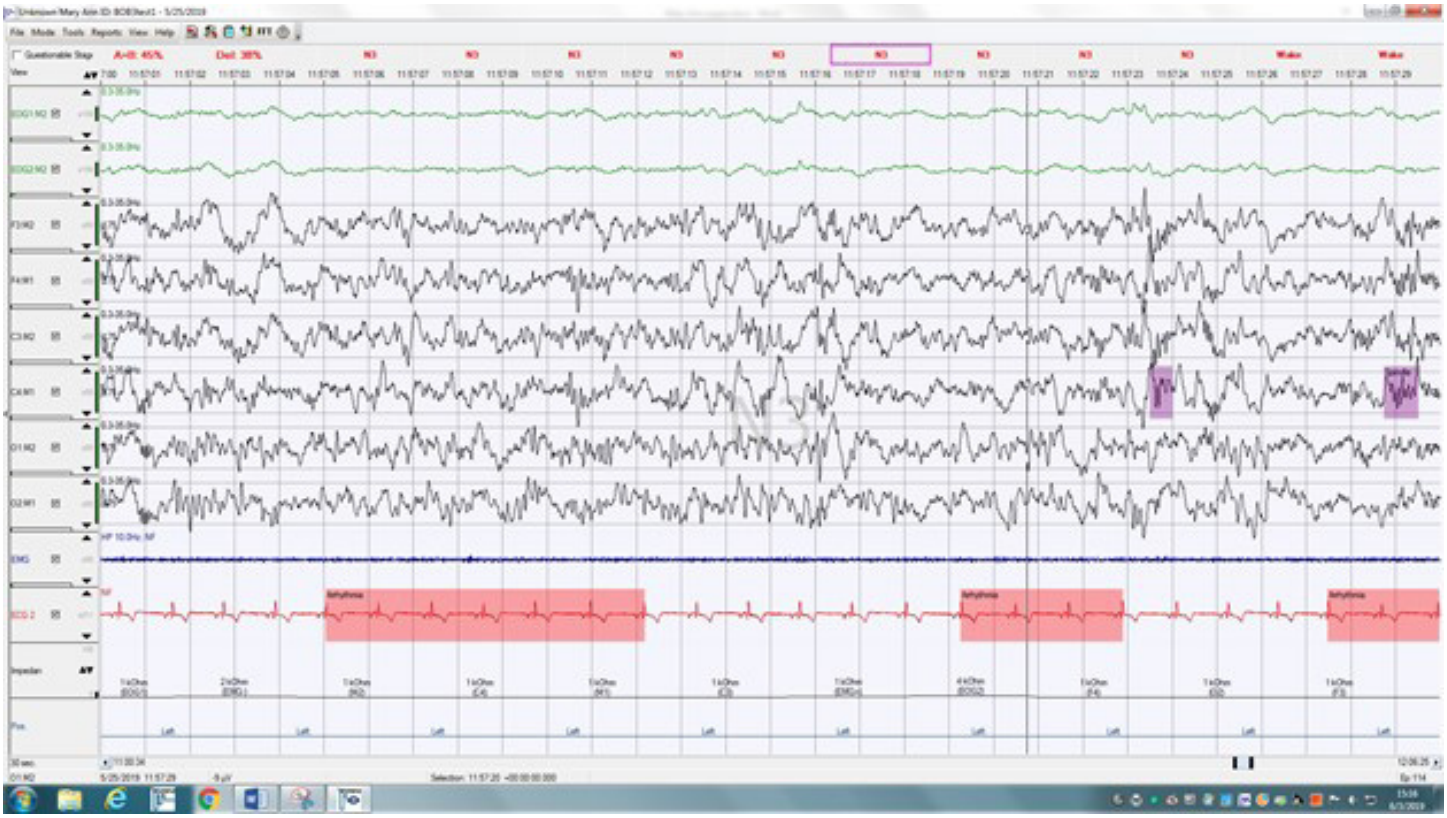
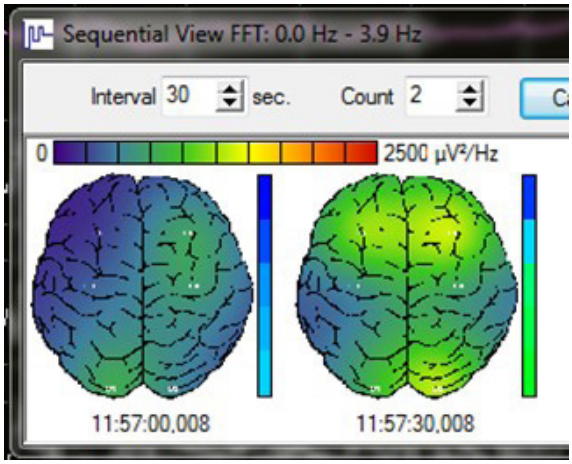


Epoch 114 – N3 (44 minutes after lights off) – note high amplitude delta EEG waves



Note light activity denoting high amplitude delta waves (0 Hz – 3.9 Hz)

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