Clinical Studies of the Mozart effect: a chronological overview

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NEUROSCIENCE LETTERS

Listening to Mozart enhances spatial-temporal reasoning: towards a neurophysiological basis

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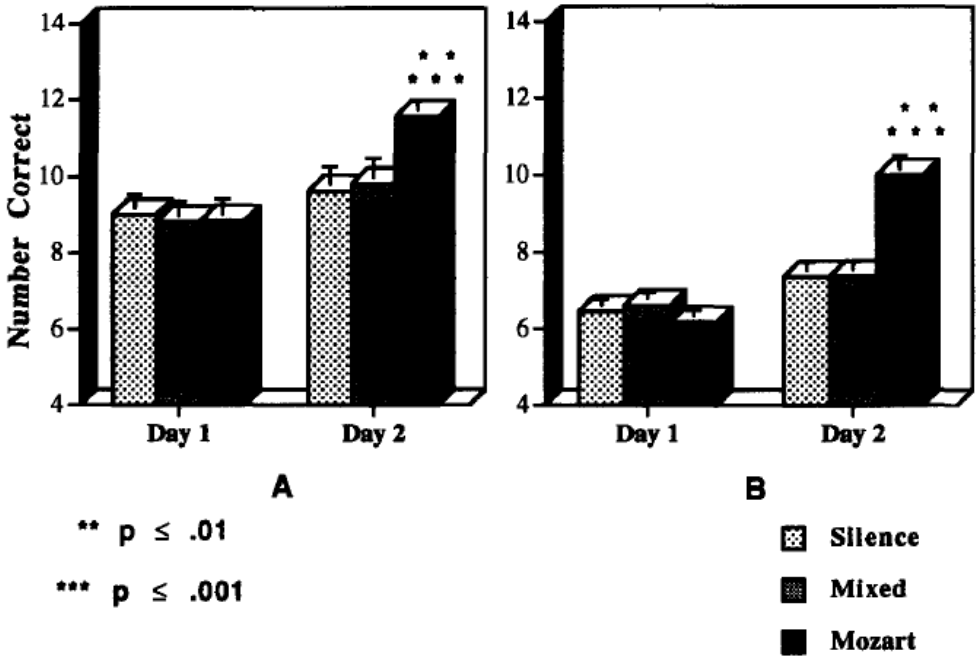

Fig. 4. (A) Mean number of PF&C items answered correctly out of 16 by the Silence, Mixed and Mozart groups for days 1–2. The Mozart group's improvement from day 1 to day 2 was significant ($P < 0.001$) and was significantly greater than the Silence and the Mixed groups on day 2 ($P < 0.01$). No other differences were significant. (B) Same as (A) only for those subjects scoring 8 or less on day 1. Note the dramatic increase from day 1 to day 2 of 62% for the Mozart group versus 14% for the Silence group and 11% for the Mixed group.

Clin Electroencephalogr. 1998 Jul;29(3):109-19.

The "Mozart effect" on epileptiform activity.

Hughes JR, Daaboul Y, Fino JJ, Shaw GL.

University of Illinois Medical Center, Chicago 60612, USA

The "Mozart Effect," using the Piano Sonata in D Major (K.448), was examined in patients with seizures. In **23 of 29 instances significant decreases in epileptiform activity were noted from patients even in coma, with status epilepticus or with periodic lateralized epileptiform discharges** (PLEDs). The effect may be immediate or require 40-300 sec to manifest itself. The change in the amount of ictal activity in one patient in coma was from 62% before the music to 21% during Mozart. Amplitudes of these discharges also have often decreased. Examples of PLEDs on both temporal areas are shown in which the effect was only on the left temporal area but in other patients only on the right temporal area. Brain maps during the music showed theta and alpha activity decreased on the central areas, while delta waves increased on the frontal midline area. The basis of this effect is likely that the superorganization of the cerebral cortex with its highly structured radial columns seen throughout both hemispheres may resonate with the superior architecture of Mozart's music.

Effect of Music by Mozart on Energy Expenditure in Growing Preterm Infants

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OBJECTIVE: The rate of weight gain in preterm infants who are exposed to music seems to improve. A potential mechanism could be increased metabolic efficiency; therefore, we conducted this study to test the hypothesis that music by Mozart reduces resting energy expenditure (REE) in growing healthy preterm infants.

DESIGN. A prospective, randomized clinical trial with crossover was conducted in 20 healthy, appropriate-weight-for-gestational-age, gavage-fed preterm infants. Infants were randomly assigned to be exposed to a 30-minute period of Mozart music or no music on 2 consecutive days. Metabolic measurements were performed by indirect calorimetry.

RESULTS: REE was similar during the first 10-minute period of both randomization groups. During the next 10-minute period, infants who were exposed to music had a significantly lower REE than when not exposed to music ($P = .028$). This was also true during the third 10-minute period ($P = .03$). Thus, on average, the effect size of music on REE is a reduction of ~10% to 13% from baseline, an effect obtained within 10 to 30 minutes.

CONCLUSIONS: Exposure to Mozart music significantly lowers REE in healthy preterm infants. We speculate that this effect of music on REE might explain, in part, the improved weight gain that results from this "Mozart effect." *Pediatrics* 2010;125:e24–e28

Epilepsy Research (2010) 89, 238—245

Mozart K.448 and epileptiform discharges: Effect of ratio of lower to higher harmonics

Lung-Chang Lin[a,b], Wei-Te Lee[c], Hui-Chuan Wu[b], Chin-Lin Tsai[d], Ruey-Chang Wei[e], Yuh-Jyh Jong[b], Rei-Cheng Yang[b,*]

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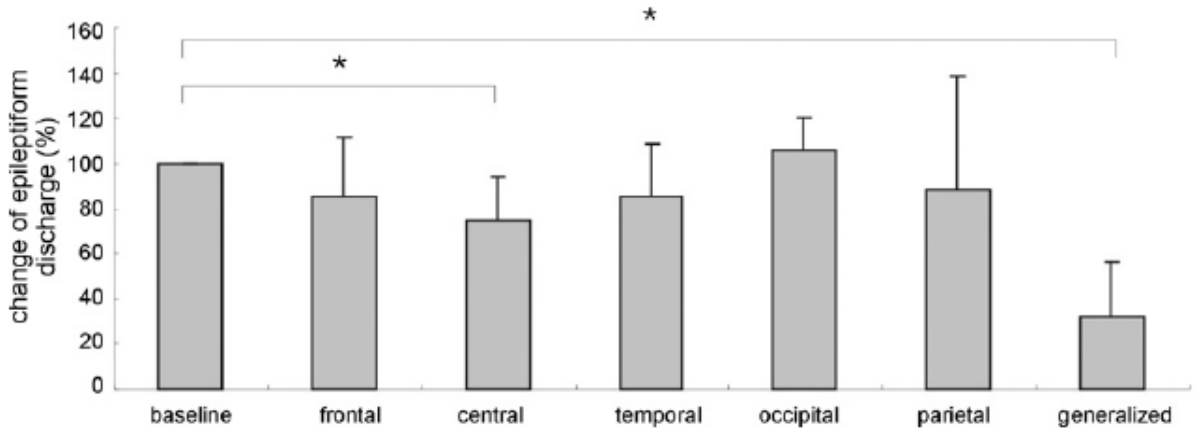

Figure 2 Exposure to piano K.448 and epileptiform discharge reduction by area of epileptic focus. Baseline ($n = 58$), frontal ($n = 5$), central ($n = 17$), temporal ($n = 12$), parietal ($n = 2$), occipital ($n = 11$), and generalized ($n = 11$). *$p < 0.05$.

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Mozart K.448 acts as a potential add-on therapy in children with refractory epilepsy

Lung-Chang Lin [a,b], Wei-Te Lee [c], Chien-Hua Wang [b,d], Hsiu-Lin Chen [b], Hui-Chuan Wu [b], Chin-Lin Tsai [e], Ruey-Chang Wei [f], Hin-Kiu Mok [g], Chia-Fen Weng [h], Mei-Wen Lee [g], Rei-Cheng Yang [b,*]

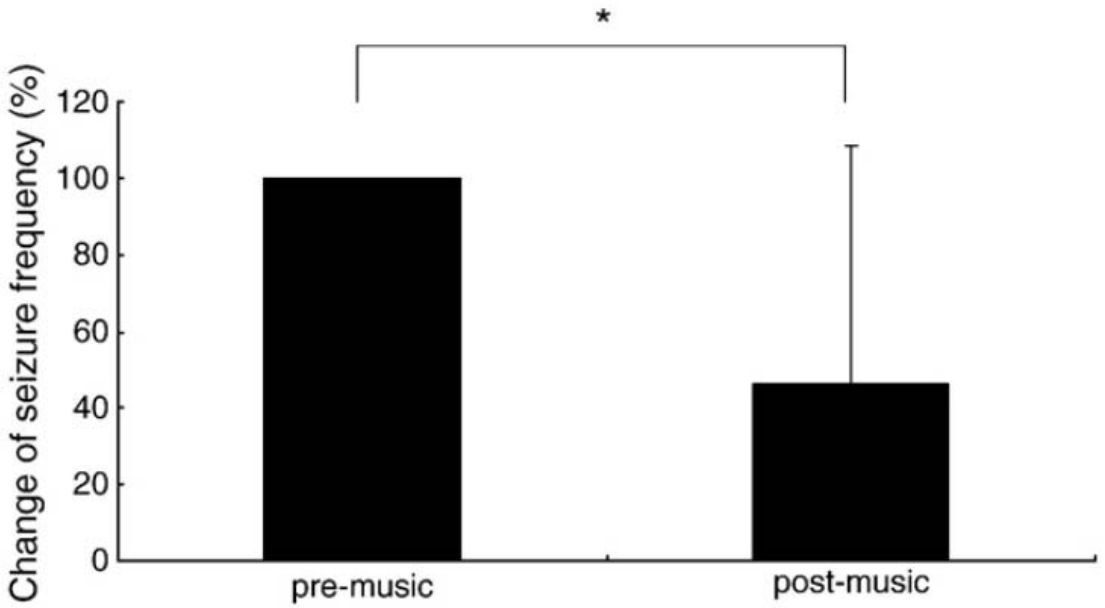

Fig. 2. Percentage seizure reduction after listening to Mozart K.448 among the enrolled patients ($N = 11$). Comparisons were made with seizure frequency prior to music exposure. $^{*}P < 0.05$.

Epilepsy & Behavior 21 (2011) 420–424

The long-term effect of listening to Mozart K.448 decreases epileptiform discharges in children with epilepsy

Lung-Chang Lin [a,b], Wei-Te Lee [c], Hui-Chuan Wu [b], Chin-Lin Tsai [d], Ruey-Chang Wei [e], Hin-Kiu Mok [f], Chia-Fen Weng [g], Mei-wen Lee [g], Rei-Cheng Yang [b,*]

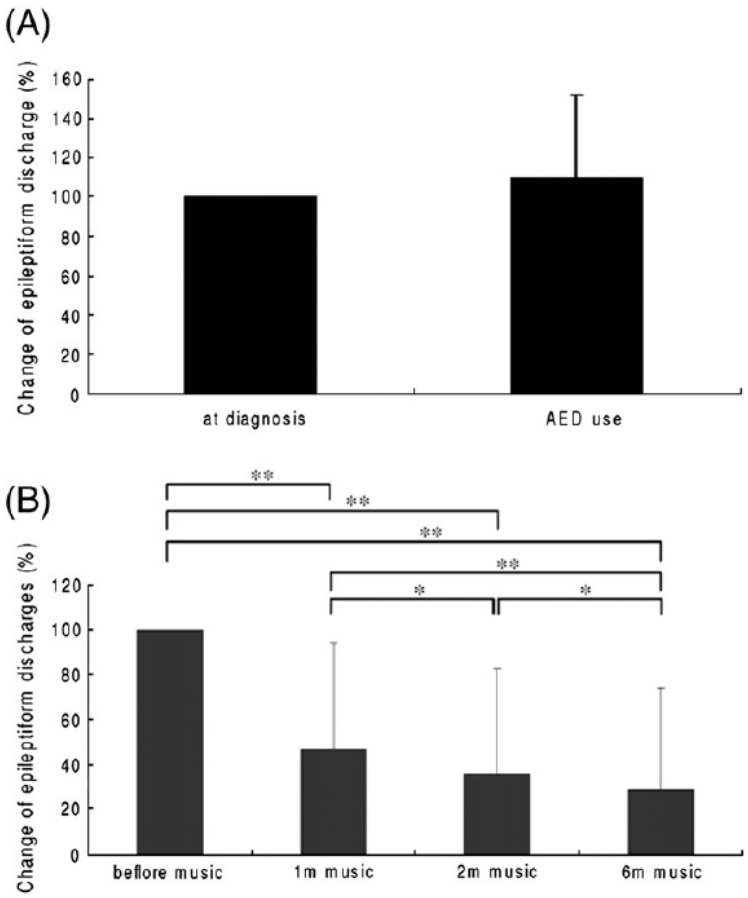

Fig. 1. (A) Comparison of the frequency of epileptiform discharges at diagnosis with the frequency after AED treatment. (B) Decrease in epileptiform discharges of enrolled patients ($N = 18$) after listening to Mozart K.448 for 1, 2, and 6 months. Comparison is made with the EEG prior to music exposure. *$P<0.01$. **$P<0.001$.

Epilepsy & Behavior 21 (2011) 420–424

The long-term effect of listening to Mozart K.448 decreases epileptiform discharges in children with epilepsy

Lung-Chang Lin [a,b], Wei-Te Lee [c], Hui-Chuan Wu [b], Chin-Lin Tsai [d], Ruey-Chang Wei [e], Hin-Kiu Mok [f], Chia-Fen Weng [g], Mei-wen Lee [g], Rei-Cheng Yang [b,*]

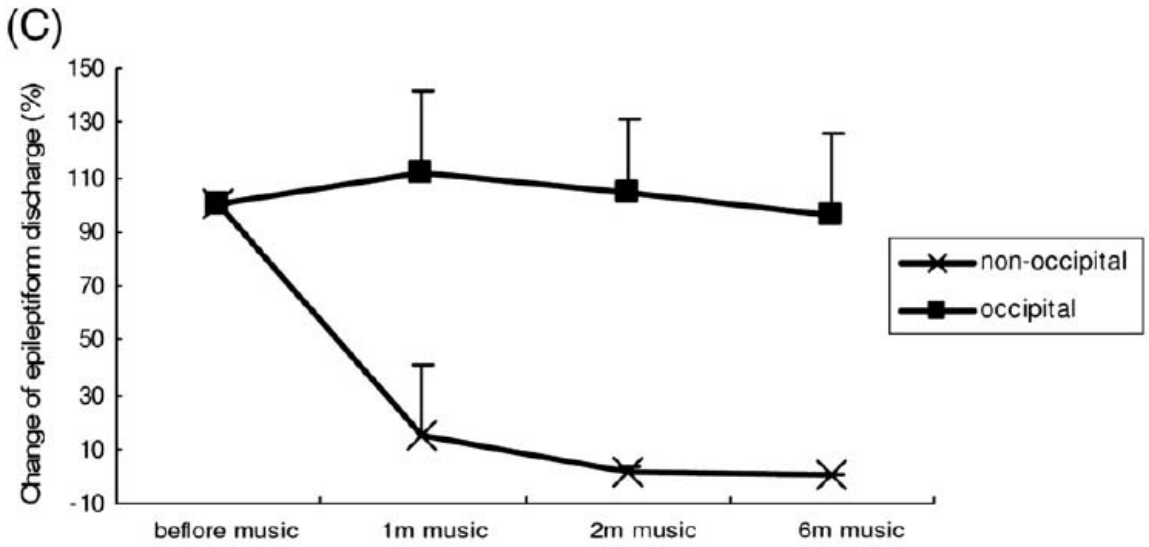

Fig. 2. (A) Decrease in epileptiform discharges at different epileptic foci after listening to Mozart K.448 for 1, 2, and 6 months: central ($N=4$), frontal ($N=1$), generalized ($N=2$), occipital ($N=5$), temporal ($N=6$). (B) Decrease in epileptiform discharges of occipital ($N=5$) or non-occipital ($N=2$) origin in patients with mental retardation. (C) Decrease in epileptiform discharges of occipital ($N=5$) or non-occipital ($N=3$) origin in patients with symptomatic epilepsy.

Research Article

Mozart K.545 Mimics Mozart K.448 in Reducing Epileptiform Discharges in Epileptic Children

Lung-Chang Lin,[1,2] Mei-Wen Lee,[3] Ruey-Chang Wei,[4] Hin-Kiu Mok,[5] Hui-Chuan Wu,[2] Chin-Lin Tsai,[6] and Rei-Cheng Yang[2]

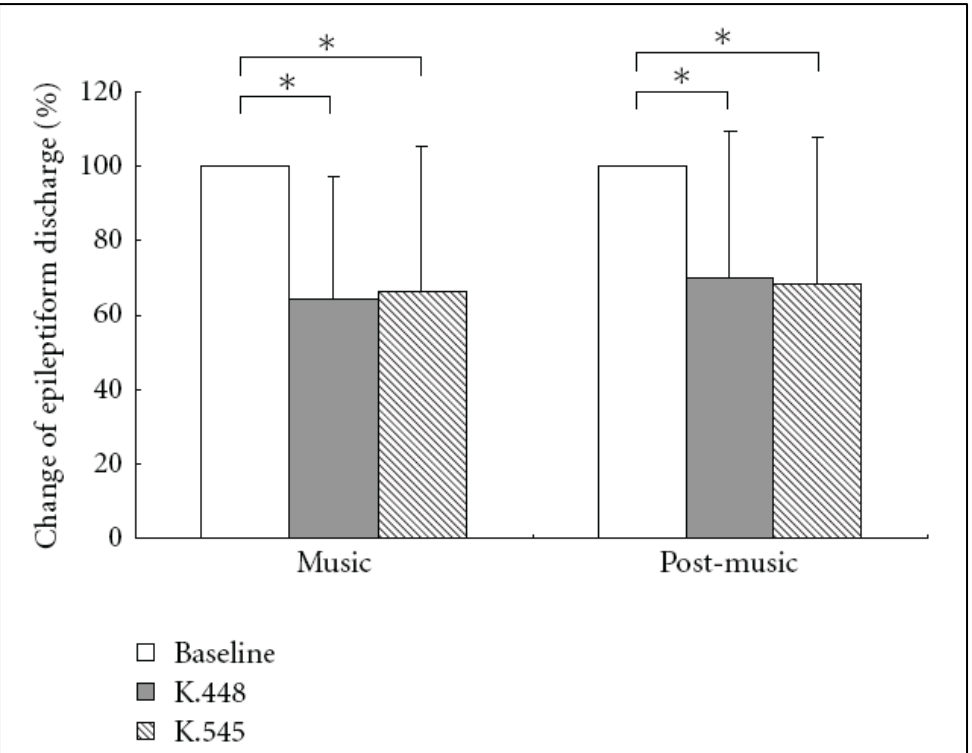

FIGURE 1: Epileptiform discharges during and after listening to Mozart K.448 and K.545. Comparisons made with baseline EEG (before music). Percentages of the decrease observed in epileptiform discharges in all patients during ($n = 39$) and after listening to Mozart K.448 ($n = 33$) and after listening to K.545 ($n = 34$). $^*P < 0.001$.

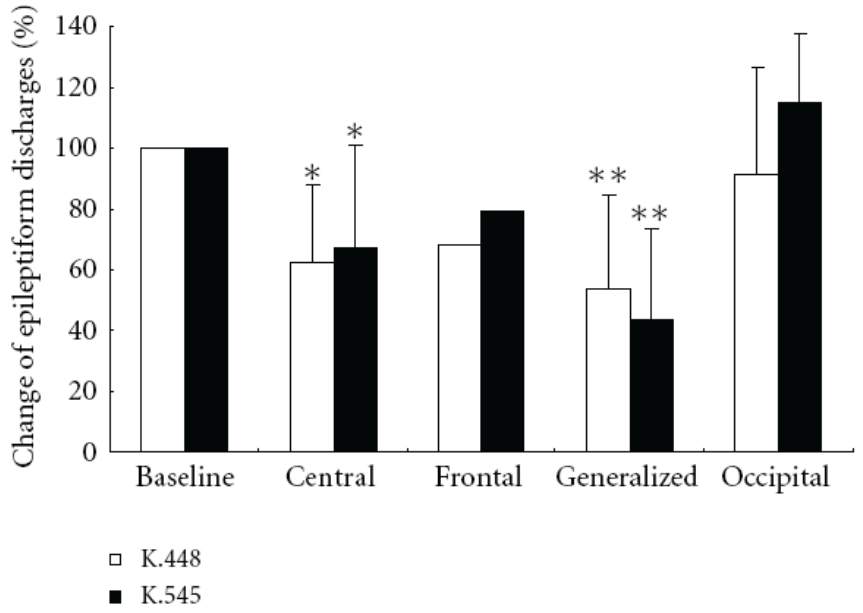

FIGURE 2: Epileptiform discharge reduction by area of epileptic focus. Comparisons made with baseline EEG (before music) baseline, central ($n = 11$), frontal ($n = 1$), generalized ($n = 19$) and occipital ($n = 8$). $^*P < 0.01$, $^{**}P < 0.001$.

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Parasympathetic activation is involved in reducing epileptiform discharges when listening to Mozart music

Lung-Chang Lin [a,b], Ching-Tai Chiang [c], Mei-Wen Lee [d], Hin-Kiu Mok [e], Yi-Hsin Yang [f,g], Hui-Chuan Wu [b], Chin-Lin Tsai [h], Rei-Cheng Yang [b,*]

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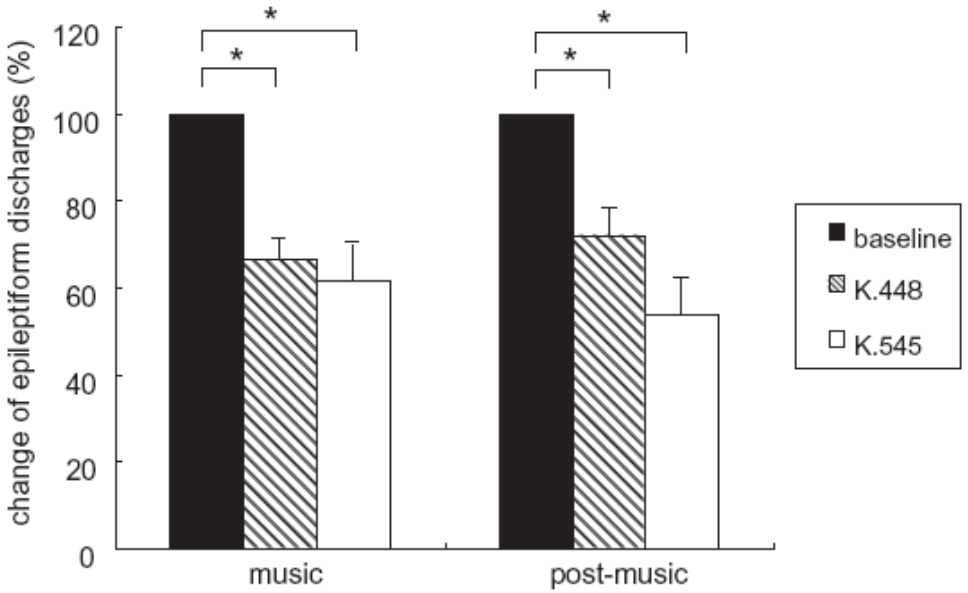

Fig. 2. Epileptiform discharges during and after listening to Mozart K.448 and K.545. Comparisons made with baseline EEG (before music). Percentages of the decreases observed in epileptiform discharges in patients during Mozart K.448 ($n = 41$) and during K.545 ($n = 23$), and after listening to Mozart K.448 ($n = 34$) and after listening to K.545 ($n = 19$). $^{*}p < 0.001$.

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PLOS ONE

Reduction of Seizure Occurrence from Exposure to Auditory Stimulation in Individuals with Neurological Handicaps: A Randomized Controlled Trial

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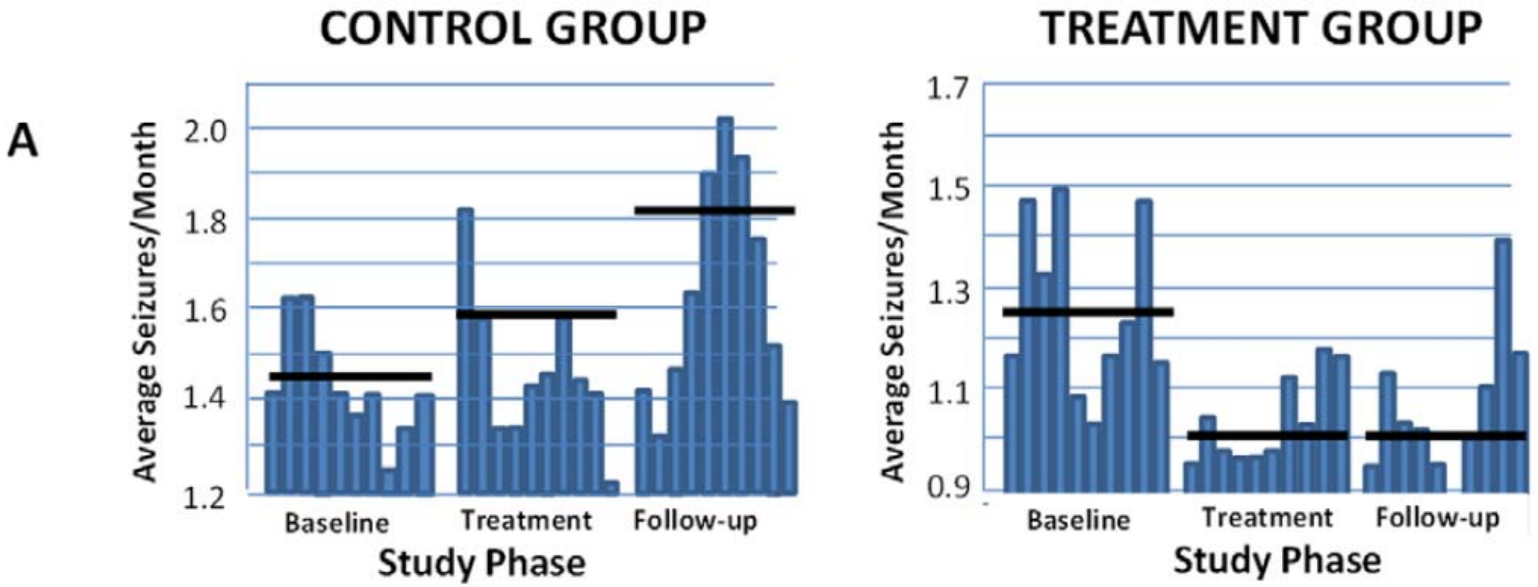

Figure 3. Seizure changes during study phases. A) Seizure rates across all phases of the study for the Control group (left) and Treatment group (right). Graphs show 3 month moving averages of seizure rates within each year, averaged across all subjects (i.e. first bar of the graph for each phase represents average seizure counts of months 1 through 3 of that phase, the second bar the average of months 2 through 4, and so on). The solid black horizontal lines indicate the average seizure rate within each phase. In the Control group the average seizure rate can be seen to increase in each consecutive year, while in the Treatment Group the seizure rate decreases from the baseline year rate, and maintains a reduced rate through the