

Quantitative EEG during Polysomnography before and after Treatment with Sodium Oxybate in Patients with FMS

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Objective: To assess Alpha/Delta sleep with quantitative EEG (qEEG) in FMS patients as a marker for the syndrome and response to medical intervention.

Introduction: Fibromyalgia is a pain syndrome that is associated with dysfunctional sleep, frequent awakenings, non-refreshing sleep, and alpha frequency intrusions. Because the GABA metabolite sodium oxybate increases delta sleep and reduces alpha intrusions, we assessed whether it may improve both the objective sleep findings and subjective pain symptoms of fibromyalgia.

Methods: Five patients with FMS underwent all-night polysomnography utilizing a Healthdyne model Alice 5 with standard electrode and sensor placements. After 2 to 6 months of treatment with sodium oxybate, the polysomnogram was repeated. qEEG analysis determined the amount of alpha and delta activity in all sleep stages.

Alpha Event (AE): 5 cycles in alpha range.

Delta Event (DE): 5 cycles in delta range.

DE/AE Ratio in non-REM sleep was calculated for all patients before and after treatment and compared to a standard Visual Analog Scale before and after treatment.

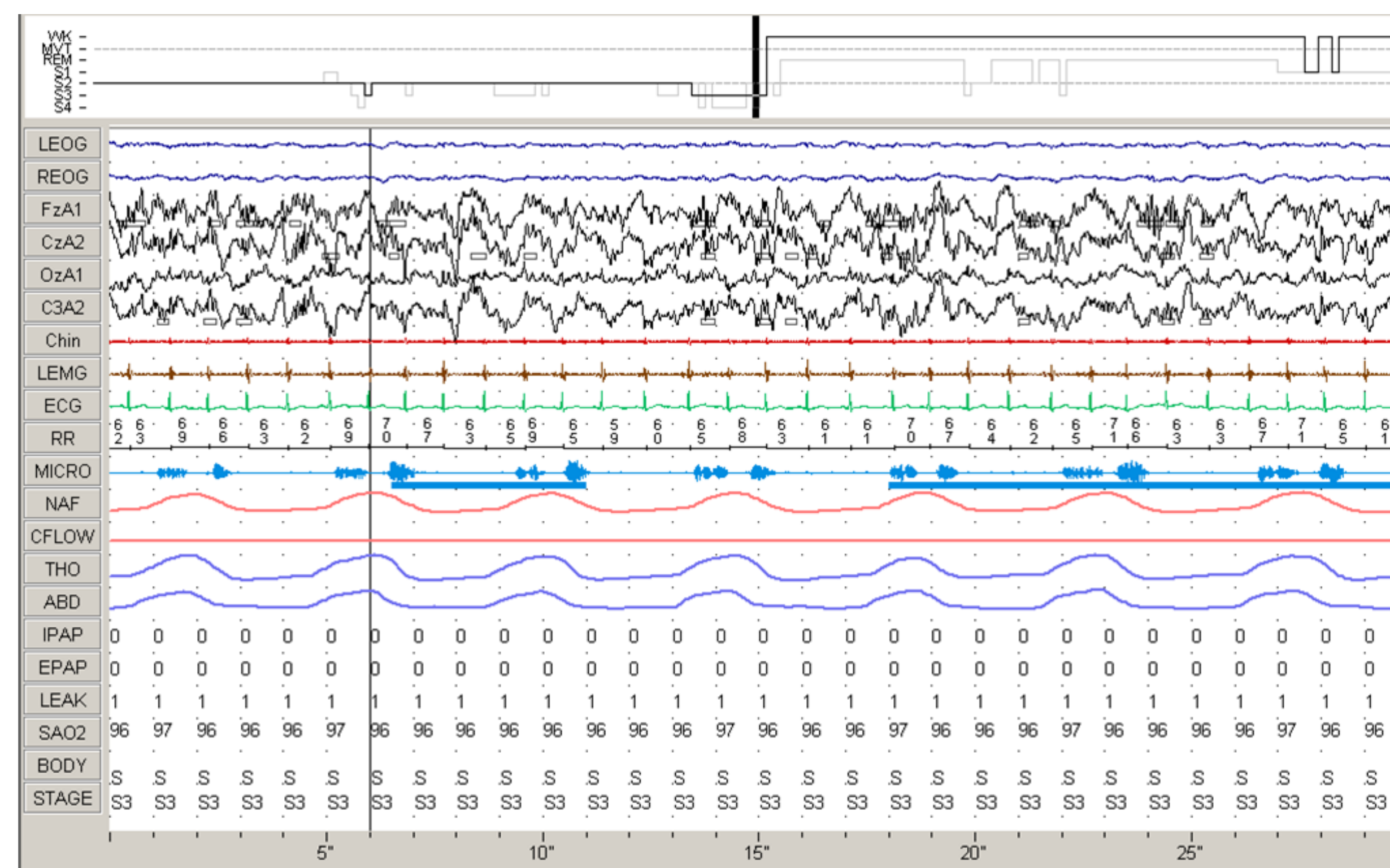


Fig. 1: Polysomnogram demonstrating Alpha Event Quantitation during a 30 second epoch.

Results:

Patient 1: DE/AE increased from 7.3 to 15.8 and VAS decreased from 9 to 1.

Patient 2: DE/AE increased from 4.5 to 6.5 and VAS decreased from 8 to 3.

Patient 3: DE/AE increased from 1.1 to 4.8 and VAS score decreased from 10 to 4.

Patient 4: DE/AE increased from 4.9 to 28.0 and VAS score decreased from 9 to 4.

Patient 5: DE/AE increased from 4.7 to 10.1 and VAS score decreased from 6 to 1.

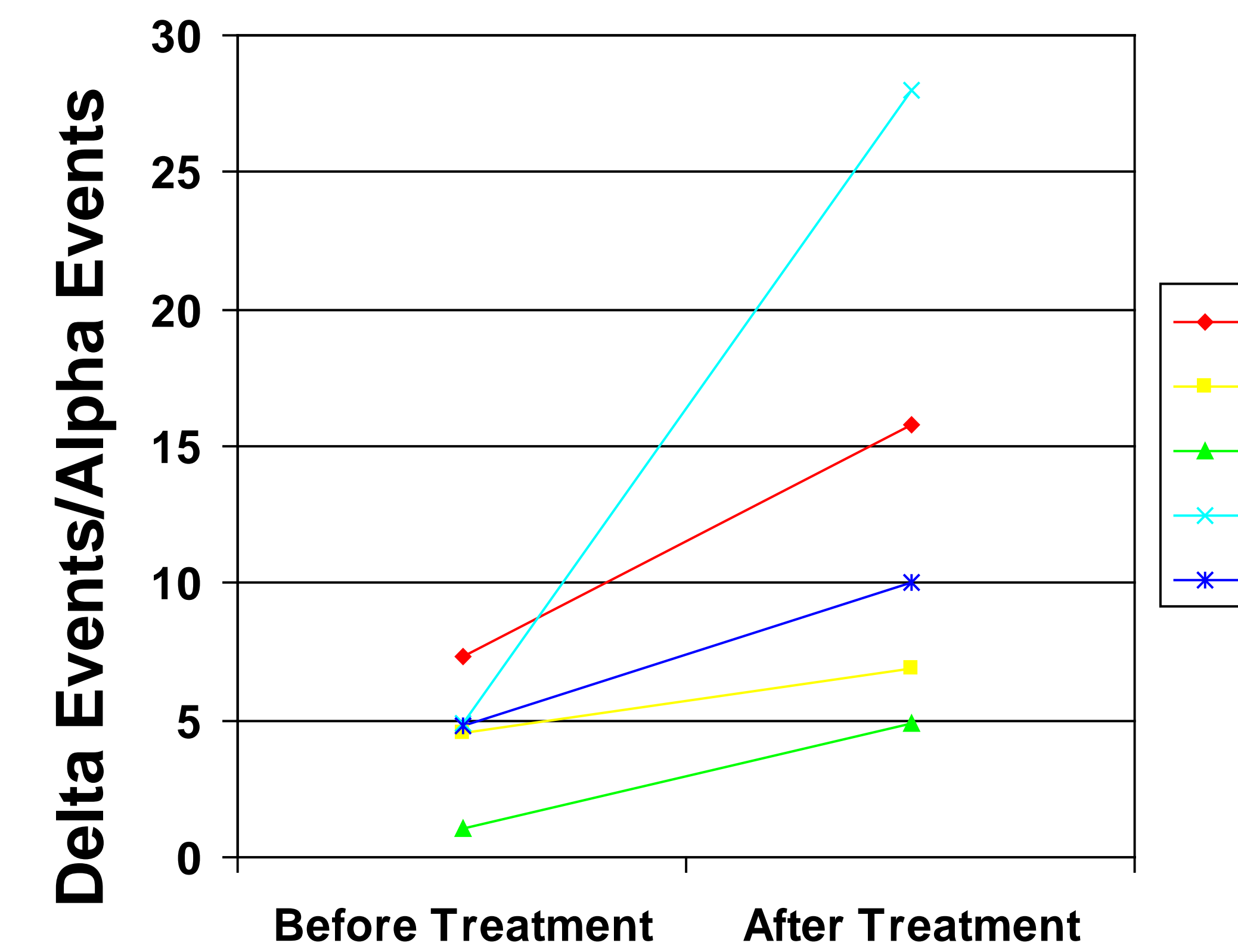


Fig. 4: The DE/AE Ratio improved significantly for each patient after treatment with Sodium Oxybate.

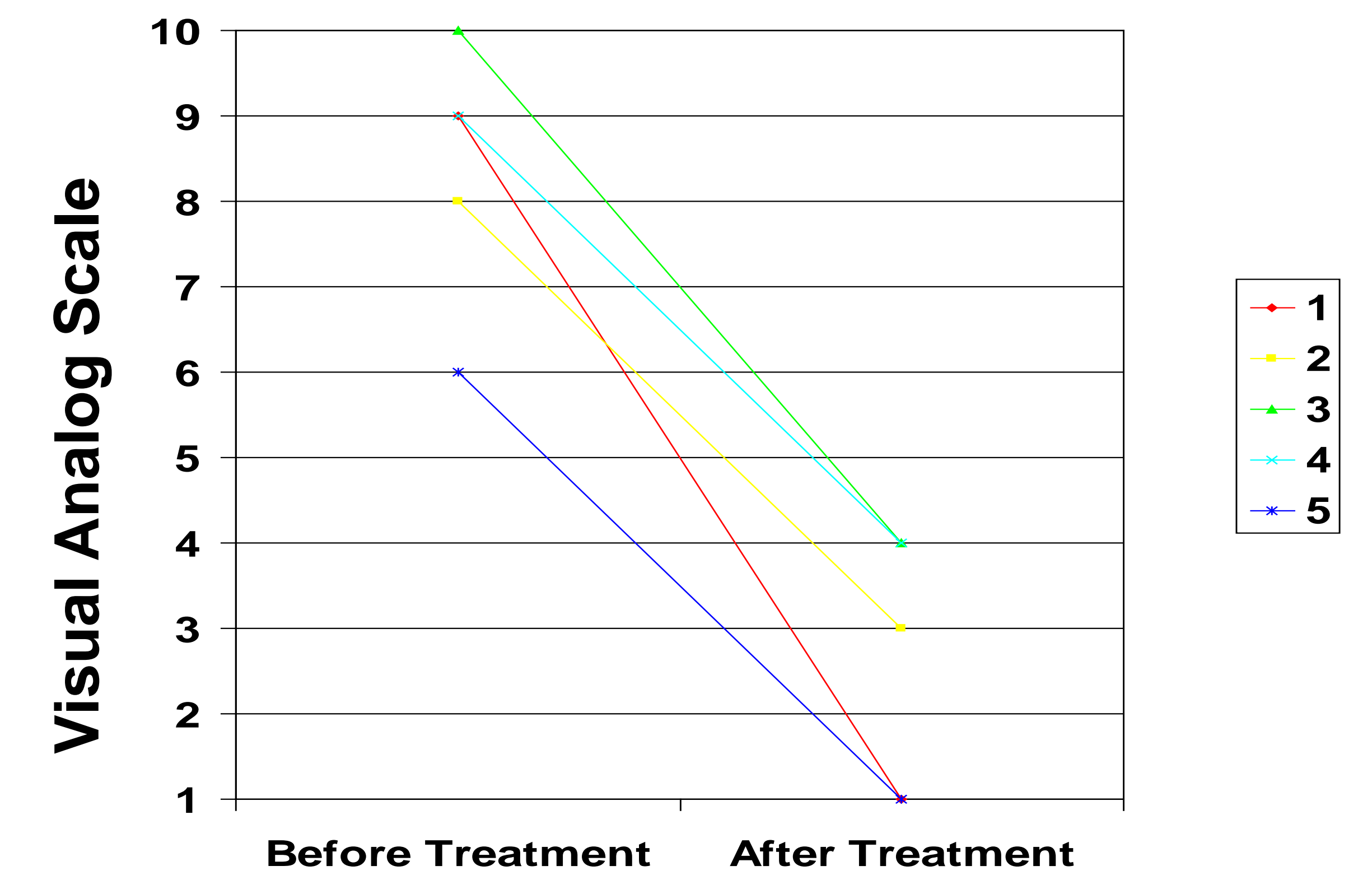


Fig. 5: Improvement in pain scores correlates with improvement in DE/AE Ratio.

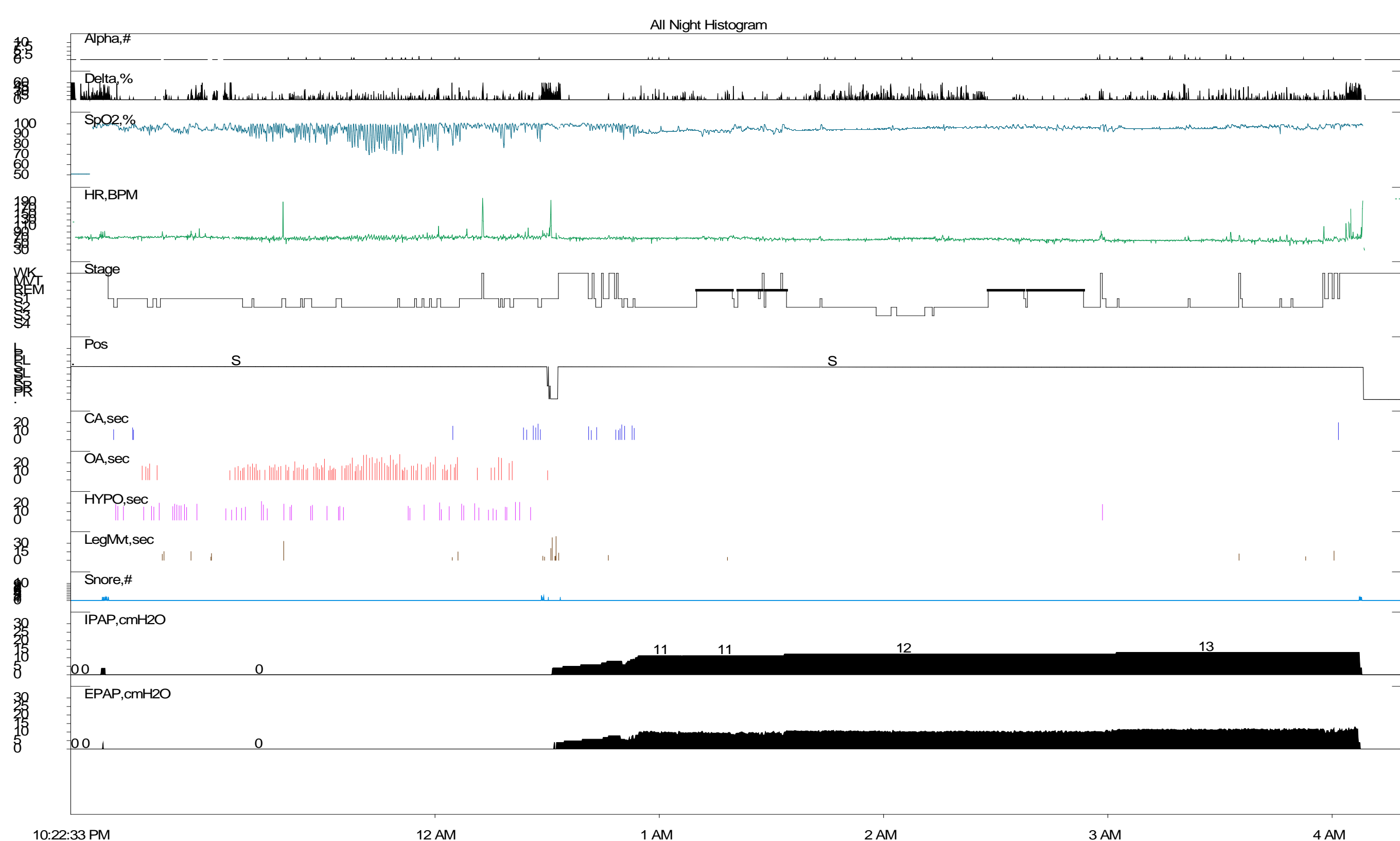


Fig. 2: Hypnogram demonstrating severe OSA before and after CPAP but no alpha sleep.

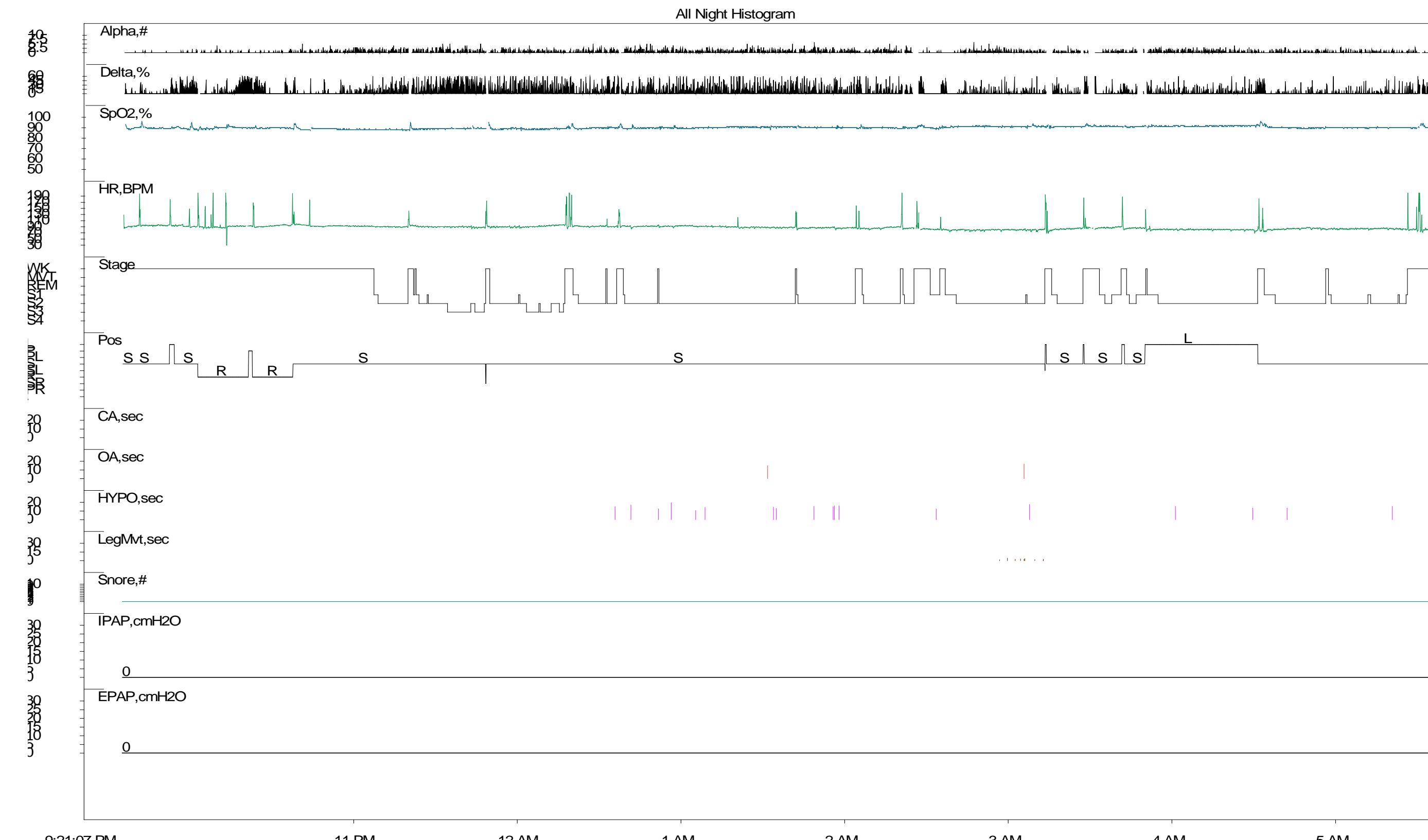


Fig. 3: Hypnogram demonstrating typical FMS patient with "Alpha/Delta" revealed by qEEG

Conclusions:

1. Sodium oxybate may be an effective treatment for the dysfunctional sleep and pain of fibromyalgia.
2. The improvement in both pain and sleep supports the general association between pain and poor slow-wave sleep.
3. qEEG during polysomnography may be a surrogate marker for treatment response in fibromyalgia.

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