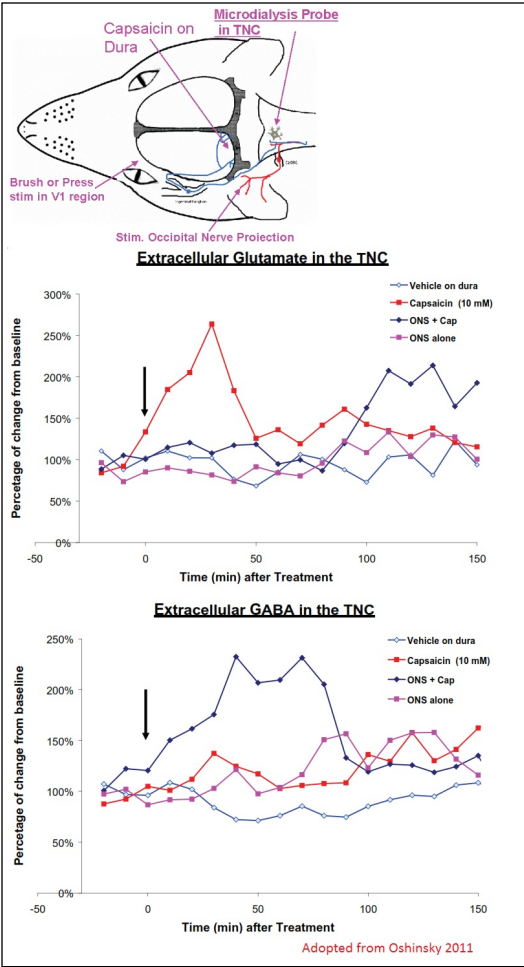


Introduction

Occipital nerve stimulation (ONS) applied to rats with capsaicin induced dural sensitization can selectively activate A-fiber to decrease trigeminal nociception. Our result of microdialysis of trigeminal nucleus caudalis (TNC) showed ONS modulate nociception by decreasing extracellular glutamate and increasing extracellular GABA at TNC. We use rat model of trigeminal allodynia to assess optimal frequency stimulation parameters for ONS.



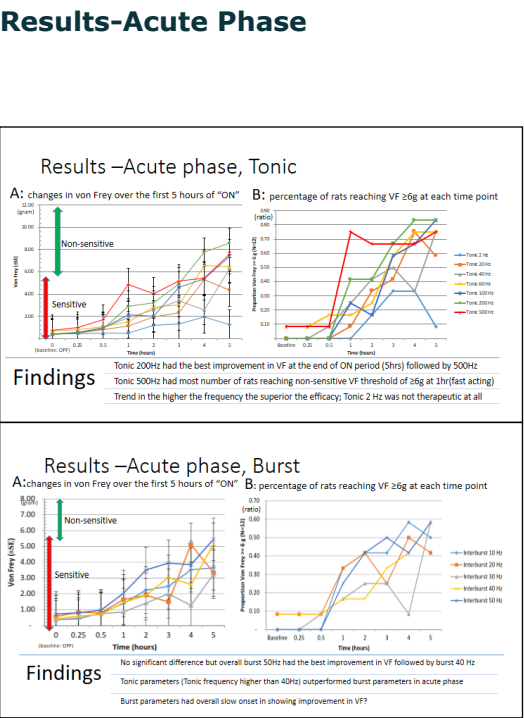
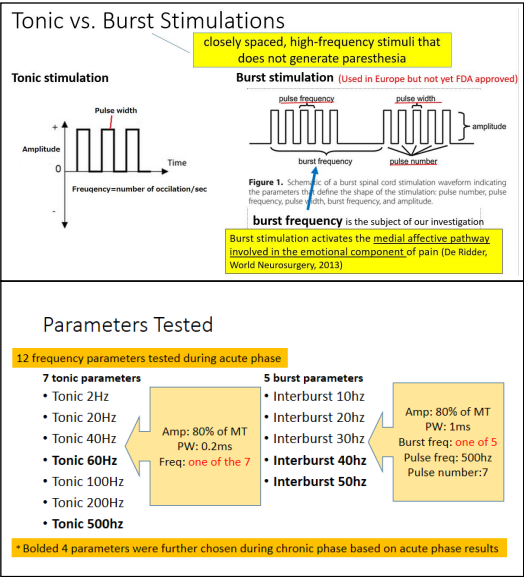
Methods

Subjects: 12 spontaneous trigeminal allodynia (STA) rats

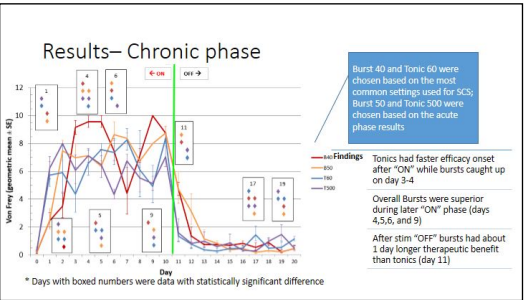
Procedure: implant electrodes over greater occipital nerves and IPG into the back of STA rats

Acute phase test: trial of 12 different frequency parameters (7 tonic and 5 bursts) randomized to 12 rats; ON for 5hours then OFF each day for 12 days. Von Frey test at baseline, 15min, 30min, 1hr, 2hr, 3hr, 4hr, and 5hr after turning ON.

Chronic phase test: trial of 4 parameters (2 tonic 2 burst) randomized to 12 rats; ON for 2 weeks followed by OFF for 2 weeks (performed 2 rounds so that each parameter had data points from 6 rats). Von Frey test daily at 9AM.



Results - Chronic Phase



Conclusions

- On STA rats, changing frequencies of ONS produced different periorbital von Frey thresholds; both tonic and burst stimulation abolished hypersensitivity.
- During acute phase (first 5 hours), high frequency tonic parameters (200Hz, 500Hz) had statistically superior efficacy than other tonic parameters or any burst parameters. Though effective, burst parameters were not statistically significantly different from each other.
- During chronic phase (2 weeks ON/OFF), tonics had high takeoff efficacy after “Stim ON” as well as faster waning of efficacy after “Stim OFF”, while burst achieved overall more days of superior improvements in VF values and longer preventative efficacy in returning to baseline sensitivity.
- Findings from this study needs to be validated in human subjects.

References: Oshinsky ML, Hirata H, Poletto C, Wacnik PW. Dural sensitization is suppressed by occipital nerve stimulation. Abstract presented at Society for Neuroscience in 2011