The Acoustic Startle Probe is a Viable Exposure Protocol for PTSD: A Clinical Case Study

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Case Description

- The patient was a 28-year-old male member of the Canadian Forces who had been deployed overseas in a combat role.
- He presented approximately one year after repatriation for assessment and possible treatment of PTSD.
- Diagnostic impression at assessment was as follows:
  - Axis I: 309.81 PTSD
    296.23 Major Depressive Disorder
  - Axis II: Not assessed
  - Axis III: None
  - Axis IV: Various psychosocial stressors associated with his social environment
  - Axis V: GAF = 41
- A unique aspect of this patient's presentation was an extremely prominent startle response, easily triggered by multiple stimuli and in multiple settings.
- The basic features of this patient's presenting problems are undisguised; however, in line with Clifft's (1986) guidelines, identifying information has been altered or omitted to protect the patient's confidentiality and privacy.

Rationale

- Initial treatment comprised an evidence-based cognitive-behavioural treatment protocol; however, despite some gains, the patient was unable to tolerate standard trauma-related exposure strategies and his prominent startle response had become his primary concern.
- Findings from previous studies suggest that startle may be due to progressive post-trauma neuronal sensitization (e.g., slower habituation of skin conductance and orbicularis oculi electromyogram response to acoustic startle; Shalev et al., 2000).
- Recent findings also indicate that interoceptive exposure (IE) exercises (e.g., shaking head side to side, hyperventilation) elicit trauma-related memories (Wald & Taylor, 2005, 2008).
- Using an IE conceptualization, we sought to determine whether repeated application of an acoustic startle protocol would serve to:
  - Habituate the prominent startle response, and
  - Facilitate exposure and overall symptom reduction by eliciting trauma-related memories.

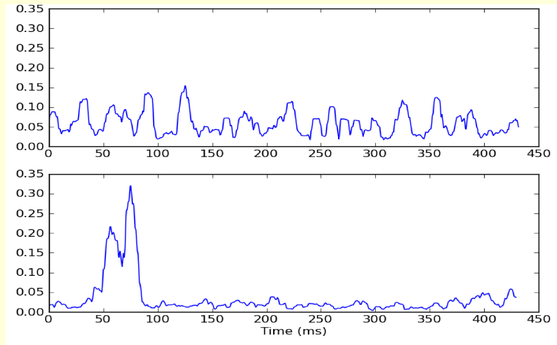
Method

- A commercially available computerized startle system (BIOPAC Systems Inc., Goleta, CA) was used to elicit and measure the startle reflex, while also measuring heart rate.
- The acoustic startle probe was a 49 msec white noise stimulus of 105 dB(A), with near instantaneous rise, presented binaurally over headphones in a silent environment.
- The electromyography (EMG) was measured using two miniature electrodes positioned on the orbicularis oculi muscle of the right eye and electrocardiography (ECG) with a standard 2-lead configuration and ground.
- EMG and ECG activity was filtered and digitized at 1 msec intervals. A 60 Hz notch filter was used to eliminate interference.
- The patient was seated comfortably in a dimly lit room approximately .75 m in front of a computer monitor displaying a cross for visual fixation.
- The patient participated in 7 trials of startle exposure over the course of 2 months, each trial lasting approximately 15 minutes.

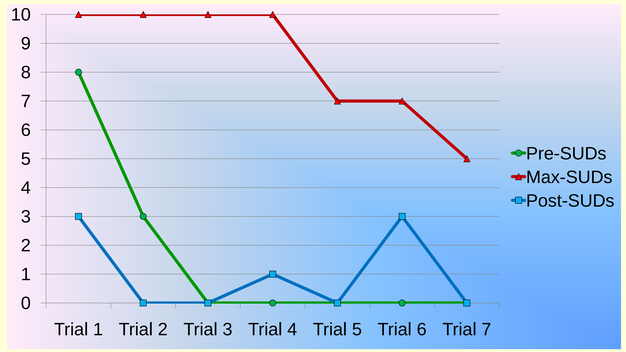
Outcome and Discussion

- The integrated EMG graph depicts the total power from the ocular muscles, with the top an EMG section from the patient and the bottom from a control participant.
  - The patient had no reliable startle as measured by ocular EMG; likewise, heart rate remained stable pre-, during, and post-startle exposure.
  - Visual monitoring revealed progressively diminished peripheral startle within and over the course of trials.
- Pre-, maximum, and post-trial subjective units of distress (SUDs) ratings are shown in the Exposure Trials graph.
  - Startle exposure elicited trauma-related images that the patient described as vivid yet tolerable.
  - Maximum SUDs ratings remained stable over the first 4 trials, then began to decline substantially over trials 5 through 7.
- The Outcome Measures graph shows an overall decline in PTSD symptoms and general anxiety, as well as decreased depression, from trials 1 through 7.
- Although preliminary, these finding suggest that the acoustic startle probe is a viable exposure protocol for (some) patients who do not tolerate standard trauma-related exposure strategies.

Integrated EMG



Exposure Trials



Outcome Measures