

Transcranial Defocusing Ultrasound to Mitigate Symptoms of Post-Traumatic Stress Disorder in the Prefrontal Cortex

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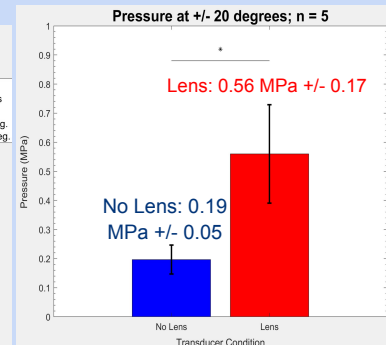
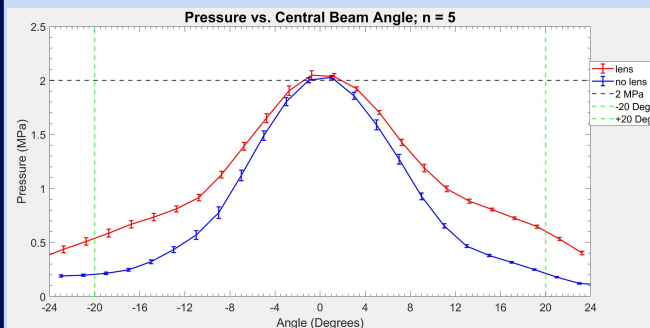


Need

- 10-15% of PTSD patients do not improve with pharmaceutical treatment
- Ultrasound Neuromodulation aids in small areas, but PTSD affects large area → Prefrontal Cortex
- Need a Diffuse Ultrasound lens to achieve therapy within a range of 400-700 kHz



Water Tank Testing and Results



Objective:

Create a transcranial ultrasound transducer with a defocusing lens that *can* be used with brain imaging technology as a form of cognitive therapy for PTSD and other cognitive disorders.

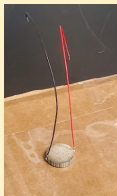
Requirements	R1: Defocus Lens that increases pressure at +/- 20 degrees	0.19 MPa → 0.56 MPa	Pass
	R2: Produce a pressure of 2MPa	Avg: 2.05 MPa	Pass

Innovation

- Diffused Ultrasound Signal
- Increased stimulated area by 4x
- Defocusing lens for Ultrasound devices



Solution Design



Transducer



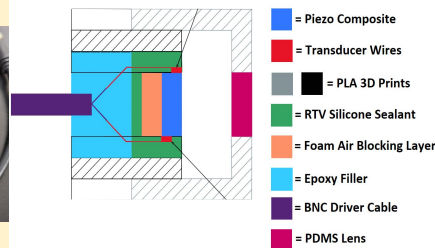
Defocus Lens



Housing



Full Device



Revisions and Future Impact

- Testing with brain imaging technologies
- New form of ultrasound therapy
- Alternative treatment to PTSD

REFERENCE

- M. E. Schafer et al. IEEE TUFFC 2021;68:54-64