Low Intensity Ultrasound Neurostimulation Therapeutic Device

Solution

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Frequency



Background

 The prefrontal cortex of PTSD patients is understood to be the most accessible and susceptible brain region for neurostimulation Existing neurostimulation devices (TMS) are limited in both time and cost for patients Ultrasound can produce neuromodulatory effects within specific brain regions at certain frequencies Need better understanding of how ultrasound neurostimulation treatments affect brain performance Objective: Develop a transducer device that is capable of neurostimulation using ultrasound within the 400-700 kHz frequency range 		Plezoceramic Disk (~12 mm dia)	Range: 400 - 700 kHz	Resonance Frequency (kHz) (Hydrophone Verification Test)				
		Housing	Disk ID #	Trial 1	Trial 2	Trial 3	Mean	SD (±)
		Matching	1456	424	417	420	420.3	2.87
		Defocusing Lens 1911		579	580	578	579	0.82
		Diazoooromia Diak	hted Transducer Housing	Epoxy M	latching La	yer Si	licone Lens	(in Mold)
<u>Constraints</u>	<u>Requirements</u>	Impact		<u>Futu</u>	re Work	<u> </u>		
C.1.) Time (~9 months) C.2.) Budget (\$300) C.3.) Resources (Dr. Lewin & Dr. Schafer Lab)	R.1.) Freq. 400-700 kHz R.2.) Compact Size (18 x 25 mm) R.3.) Performs within Safety Standard in CFR Title 21	- Novel neurostimulation device with compact and cost effective design allows for greater accessibility for PTSD patients and hospitals		 Testing further PZT frequencies Clinical trials of ultrasound device Addition of fNIRs feedback system to improve stimulation 				