



Immersive Soundscape Favorably Impacts Patient Experience During Office-Based Vascular Procedures: Early Results From a Randomized Controlled Trial

Ina Soh, M.D., M.S.¹, Marin Chavez, M.D.¹, Austin Pierce, M.D.¹, Victor Davila, M.D.¹, William Stone, M.D.¹, Claire Yee, Ph.D.², Andrew Meltzer, M.D., M.B.A¹, Ellen Meltzer, M.D., M.S.³

¹Division of Vascular & Endovascular Surgery, Mayo Clinic Arizona, ²Division of Research Biostatistics, Mayo Clinic Arizona, ³Mayo Clinic Experience and Section of General Internal Medicine, Mayo Clinic Arizona

BACKGROUND

- Spatial sound (*Spatial Audio*, *Scottsdale, AZ*) is an audio technology that creates **immersive soundscapes (IS)** that simulate both real-world and virtual environments.
- While this technology has been used to enhance experience in a variety of recreational and commercial environments, healthcare application has yet to be validated.

OBJECTIVE

- The evaluate the **impact of immersive soundscapes (IS)** on patient experience during common **office-based vascular procedures** in an IRB-approved randomized controlled trial:
 1. **Endovenous radiofrequency ablations (RFA)**
 2. **Port-a-cath removals (PR)**

METHODS

Patients undergoing RFA and PR in an office-based procedure suite were **randomized to IS vs. control** at the time of procedure scheduling.

Patient experience was assessed quantitatively using **self-reported visual analog scores** for pain, anxiety, and stress at pre-determined procedural steps:

- Pre-procedure
- During local anesthesia administration
- Procedure completion

Concurrent **physiologic measures** included heart rate and blood pressure.

Qualitative assessment was performed using patient **narrative survey**. In addition, staff experience was assessed using a **dedicated staff survey** instrument.

Informed consent was obtained from all participants.

RESULTS

- 48 consecutive patients agreed to randomization, (23 IS, 25 control)
- No differences in procedure type (46% *RFA*, 54% *PR*), median age [61.5 (46.0, 70.0)], sex (81% *female*), or race (83% *white*)
- Patients exposed to IS reported **reduced pain, stress, and anxiety** during the pre-procedure assessment, intraprocedurally, and upon procedure completion
- **Post-procedural stress was significantly reduced with IS** [6.2+/-10.2 vs. 21.9+/-23.5; *P*<0.01, Table 1]
- **95.2%** of patients randomized to IS indicated that **spatial sound positively impacted their experience**
- **100% would recommend IS** to other patients undergoing outpatient procedures
- Staff self-reported stress was not impacted by IS and there were no differences in staff environmental distraction rating

TABLE 1: Patient-reported stress level using *visual analog scale (0-100)*

	Control (N=25)	IS (N=23)	Total (N=48)	p-value ⁺
Stress (pre-procedure)				0.41
N	25	22	47	
Mean (SD)	30.4 (24.41)	25.5 (23.50)	28.1 (23.86)	
Stress (post-local anesthesia)				0.24
N	23	22	45	
Mean (SD)	32.6 (26.88)	24.3 (25.37)	28.6 (26.19)	
Stress (post-procedure)				0.01
N	24	21	45	
Mean (SD)	21.9 (23.54)	6.2 (10.24)	14.6 (19.99)	

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CONCLUSIONS

Early results of this RCT suggest favorable results with IS in the outpatient vascular procedure setting. While only post-procedure self-reported stress was significantly lower with IS, there is obvious suggestion of improved patient experience based on current quantitative and qualitative data. Ongoing work will better refine the applicability of IS in the vascular procedure suite.